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Believing that many plant operating men do not fully realize the many applications of air power cylinders, hoists and compressors, Curtis Pneumatic Machinery Company has prepared a new 28-page booklet which gives a summary, by industries, of the most successful uses for air. This information is compiled from Curtis' 44 years' specialization in the air power field, and from surveys made by an industrial research organization.

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AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Reg. U. S. Pat. Off.
Published Weekly

Volume 78

Number 15

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HERBERT HOSKING, Editor
P. M. HELDT, Engineering Editor J. B. POLLOCK, Asst Editor
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(Incorporated)

Executive Offices
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AUTOMOTIVE INDUSTRIES

Production

Schedules Reflecting First Signs Of Seasonal Influences

Seasonal influences, though not as strongly evident as in normal years, showed their first signs of affecting car and truck production this week as factory schedules showed a gain that reflected the first promising upward trend since early in the first quarter of the year.

While not spectacular, the industry's increased output over last week is estimated at some 7500 or 8000 units and compares with a sidewise movement of around 50,000 units per week throughout all of March. Because of the increase it is estimated that this week's total output will be in the neighborhood of 58,000 cars and trucks.

There are signs that retail sales are running ahead of production by a slight margin with factories maintaining their policies of keeping dealers stocks down as much as possible and showing a general unwillingness to force the market, thus reflecting a desire to help their dealers move present stocks of both new and used vehicles as rapidly as the market will absorb them.

This is borne out by sales reports for the last 10 days in March which now are beginning to come through. Chevrolet, for example, reports that its dealers sold 62,639 new cars and trucks in March, of which 27,606 were sold during the last 10 days. Sales during the last 10 days were 78.8 per cent of the total for the first 20 days and sales for the entire month of March were 57.2 per cent ahead of February.

Chevrolet dealers sold 130,788 used cars during March, an increase of 11.9 per cent over February and March represented the 37th consecutive month that they have averaged in excess of 100,000 used car sales.

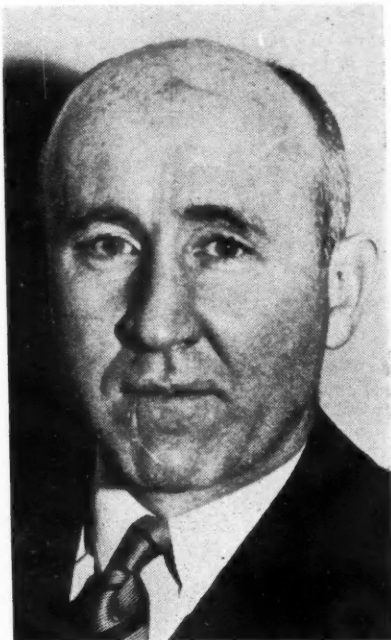
Buick sales during March totaled 15,359 units with a sharp upturn encountered during the last 10 days of the month. March sales showed
(Continued on page 499)



News Photo Picture

FRED D. FAGG, JR.

... director of the Bureau of Air Commerce who retires from that post April 16 to become the dean of the School of Commerce of Northwestern University.



News Photo Picture

DENIS MULLIGAN

... assistant director of the Bureau of Air Commerce who will be advanced to the post left vacant by F. D. Fagg, Jr.

Labor

Chrysler Renews Contract With UAW

Michigan observed the latest refinement in strike technique, labeled the "work-in" strike, when members of the Utilities Workers Organizing Committee, a CIO affiliate seized power plants of the Consumers Power Co. in Lansing, Saginaw, Flint, Bay City and other parts of central and eastern Michigan but continued to operate them, after driving out regular workers and supervisory employees. The power plants seized serve 2,000,000 residents including many important automotive manufacturing plants.

The strike, which had been called by the UWOC because it claimed it feared wage reductions and loss of its right as sole bargaining agency for the company's employees, was settled on April 4 after Governor Frank Murphy had made a hurried trip from Florida and had called a conference between representatives of the company and the union.

Terms of the settlement included a four months' extension of the present agreement, with a guarantee of no reduction in wages and retention of sole bargaining rights by the UWOC during the period of the extension. It was also agreed that efforts would be made to hold an election under the National Labor Relations Board to determine which of three contesting unions should represent the company's 6000 employees in labor negotiations.

The incident which led to calling of the strike was an injunction secured by the Independent Power Workers Association, charged by the UWOC as being a company union, forbidding the company to negotiate for a renewal of its union contract until an NLRB election had been held. The AFL also entered the fight with the claim that its Brotherhood of Electrical Workers represented a majority of the company's employees. The NLRB is now investigating the
(Continued on page 498)

Chrysler Asks Declaratory Judgment

Seeks Early End to Manufacturer-Dealer Finance Case

Seeking to bring an early end to the automobile manufacturer-dealer finance case, which was abruptly halted in Milwaukee last December when Federal Judge Ferdinand A. Geiger of the Eastern District of Wisconsin discharged a grand jury, the Chrysler Corp. last week filed a petition in the United States Circuit Court in Washington asking a declaratory judgment establishing legality of its relationship with dealers.

Denying that it has illegal financing relationship with its dealers, the Chrysler Corp., naming Attorney General Homer S. Cummings as respondent, contended that it is entitled to have a judicial determination of the controversy under the Federal Declaratory Judgment Act in order to avoid irreparable injury. The petition, which affords the possibility of speedy and inexpensive legal determination, was filed by William Stanley of Washington, a member of the New York law firm of Larkin, Rathbone & Perry. Mr. Stanley resigned in 1935 as assistant to the Attorney General.

The Department of Justice has 20 days from the date of filing of the petition to make response. Though it has not stated its position the prevailing assumption is that the petition will be contested by the Government. On the other hand, if it were not contested and the Court handed down a declaratory judgment the proceedings would be quickly ended, and presumably would set a precedent for bringing final determination to the entire case. It would thus affect other automobile manufacturers and finance companies which are involved in the highly controversial proceedings. They have developed sharp charges and countercharges on the part of both sides as well as a House Judiciary Committee inquiry of allegations brought by the Department of Justice against Judge Geiger. The accusations against the Judge of obstructing the administration of justice were ostensibly made with a view to possible impeachment proceedings. However, the House Committee, which held hearings, has never made a report and apparently was not at all impressed with charges by the Department of Justice.

The petition asked for a declaratory judgment adjudging terms of Chrysler contracts with its dealers with respect to financing sales at retail to time buyers do not constitute a violation of the Sherman Anti-

Trust Act. It was pointed out that the company "desires to obtain an adjudication as to the propriety of such contracts (with dealers) so that it may continue its business . . . without being subjected to continued harassment from and claims of illegality."

The petition said that violation of the Sherman law permits action for three-fold damages and that the statute of limitations shall be suspended pending every private right of action arising under the law.

The Chrysler Corp. has no contract with the Commercial Credit Co., which finances sales of Chrysler cars—Chrysler, Dodge, DeSoto, Plymouth. The petition pointed out more than 50 per cent of all new cars produced by Chrysler are purchased at retail from its dealers and associate dealers on time payment plans.

The petition quotes a provision in all current contracts with dealers which requires that there be made available in connection with the retail sales of Chrysler-made cars financing facilities at as low cost to the public as possible, "because the effect of low finance charges is to enable buyers to obtain petitioner's products at a smaller cost, thereby increasing sales."

NLRB Investigates URW Charge Against Goodyear and Goodrich

The National Labor Relations Board started its investigation of charges filed against Goodyear and Goodrich by the United Rubber Workers April 4. Walter Taag, field investigator under Regional Director James P. Miller, conferred with officials of the Goodyear and Goodrich unions Monday.

At the same time Mr. Miller presented his proposal to stabilize employment in the rubber industry to the management of the industry and the unions. The plan guarantees annual wages and hours and sets up a tribunal to settle grievances to be governed by an industrial coordinator.

The petitions filed by the URW unions charge Goodyear and Goodrich with refusing to bargain collectively.

Meanwhile the NLRB at Washington ordered the Kelly-Springfield company of Cumberland, Goodyear affiliate, to reinstate with back pay six employees allegedly discriminated against by the Cumberland company.

The board also ordered the company to withdraw recognition from the Kelly-Springfield Employees Protective Association, Inc. The men reinstated are members of the URW.

Chief cause of the dispute between the company and the union was the fact that 34 union men previously employed were not included among 900 workers added to the payroll in the spring and summer of 1936. Only six cases were pressed.

Two New Fiats

The Fiat Co., Italy, has announced that it will introduce two new models during 1938, according to a report to the Commerce Department by the office of the American commercial attache at Rome.

One of the models will have a six-cylinder engine of 122 cu. in. piston displacement, the other will be of 67.3 cu. in. displacement.

According to statistics recently made public by Fiat, a total of 66,000 automobiles were manufactured by the company in 1937, compared with 44,000 for 1936. Exports of Fiat cars, exclusive of exports to Italian Africa, totaled 21,174 units for 1937. Exports for 1936 were 12,697 units.

During 1937 the Fiat company constructed Diesel engines totaling 69,000 horsepower, representing an increase of 27,000 horsepower over 1936. Ship engines for foreign countries built by the company during 1937 totaled 30,000 horsepower, it was reported.

... slants

DEMOCRATIC PROTECTION—Alfred P. Sloan, Jr., chairman of the board of General Motors Corp., concluded a recent radio address on the subject "WHAT IS foreign trade, WHY and HOW?," by saying, "Thus my thinking leads me to the belief that the efforts of Secretary Hull to promote foreign trade mean more to us than the expansion of our industries and the creation of more wealth. They may well serve to protect our free and democratic institutions, and assure the continuation of individual enterprise—the American system, in other words."

ENGINEERS JOIN C.I.O.—The Society of Designing Engineers, an independent organization of 2000 automobile engineers, has voted to join the Federation of Architects, Engineers, Chemists and Technicians, an affiliate of the C.I.O. This was announced by Marcel Scherer, national organizational director of the federation. (See next page.)

In a referendum which started March 15, 58 per cent of the membership voted for the affiliation, Mr. Scherer said. The society will be known henceforth as the Auto Division of the Federation of Architects, Engineers, Chemists and Technicians.

UNFAIR COMPETITION?—Deception in advertising the price of automobiles is alleged in a Federal Trade Commission complaint against the Willys-Overland Motors, Inc., Toledo. The FTC charged that an advertisement picturing a four-door sedan and featuring the price of \$395 f.o.b. Toledo or that price plus transportation charged to point of delivery was deceptive because the figure was not the actual f.o.b. price of a four-door sedan but of a cheaper car. The FTC alleged that even the cheaper make could not be purchased, ready for operation, without the retail purchaser paying additional charges for certain accessories needed for actual or legal operation and for other items like taxes, advertising, handling and conditioning.

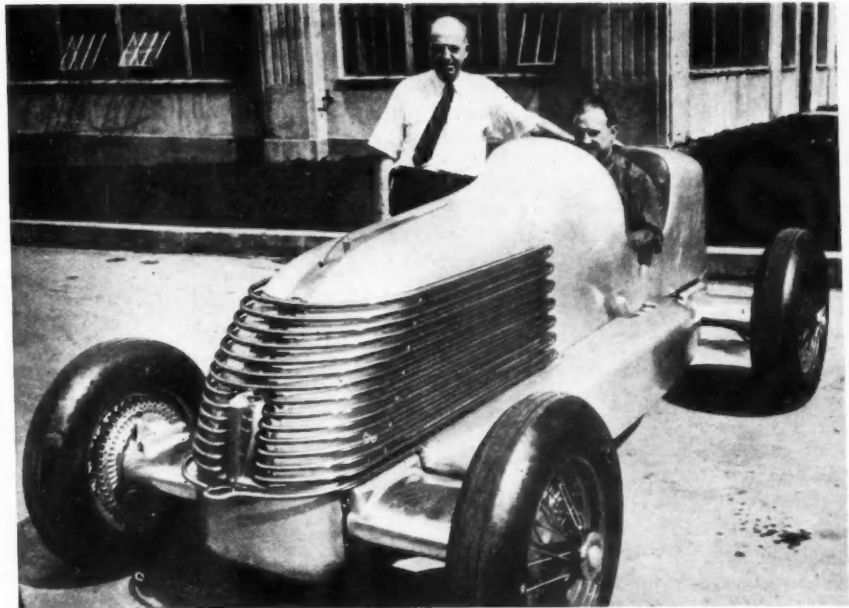
Below the picture of the car featured for \$395 is alleged to have appeared the phrase "The New Willys \$395" and in much smaller and less conspicuous type, "List F.O.B. Factory, Toledo—for the standard coupe—other models at higher prices."

EFFICIENCY, 118 PER CENT—As a "Slant" in the March 26 issue, **AUTOMOTIVE INDUSTRIES** reported that of the 14,000,000 lb. of mohair produced in the United States in 1937, the Angora goats of Texas produced 16,558,000 lb. Thus making said goats about 118 per cent efficient. Correct figures are: U. S. production for 1937 in the seven leading mohair producing states—16,558,000 lb.; Texas goat share—14,000,000 lb.

N.A.U.A. Insurance Manuals To Use Symbol Rating

The use of symbols instead of prices in the new insurance manuals now being published by the National Underwriters Association has made it possible to assign the newer models, having no f.o.b. factory prices, to the same rating groups as under the "90 per cent of delivered-at-factory price" plan adopted temporarily for 1938 models.

Formerly, delivered-at-factory prices were used for grouping cars of 1938 and future models while continuing f.o.b. factory prices for earlier models.



FIRST Harry A. Miller, builder (standing), and Billy Wynn, driver, with the first of the new 1938 model race cars to appear at the Indianapolis raceway. The car is one of five Miller is building for the Memorial

Day classic. Its four-cylinder engine turns up 235 hp. at 4500 r.p.m. Distinctive features are its gasoline tanks which appear to be running boards and the water cooling pipes arranged as a modernistic grille.

Congress Passes Withrow-Minton Bill

*Resolution Approved Despite F.T.C. Conference
Scheduled for Detroit, April 26*

Despite the fact that a Federal Trade Commission fair trade practice conference covering identical subjects has been called for April 26 in Detroit, Congress has passed the Withrow-Minton resolution providing for an F.T.C. \$50,000 investigation of manufacturer-dealer relations in the automobile industry. If signed by the President, the bill will become a law and the F.T.C. will clear its farm machinery study decks and be prepared to launch the investigation, doubling, as it were, on its own tracks.

The final stumbling block in the way of passage by the Senate of the resolution was authorization of the \$50,000 appropriation by a Congress which has appeared increasingly reluctant to approve indiscriminately even relatively small appropriation items. Some observers had it that the bill would be sidetracked at the eleventh hour because of the F.T.C. invitation to manufacturers for trade practice conferences with dealers, but the Senate gave the measure its stamp of approval even after the conferences were announced.

Representative Withrow, Democrat of Wisconsin, sponsor of the resolution on the House side, denied there was any connection between the inquiry called for by his resolution and the F.T.C. conferences with

both manufacturers and dealer representatives, although the agenda announced by the Commission is broad enough to permit discussion of the identical points covered in his resolution.

He concedes that manufacturers already have moved to modify and improve their relationship with dealers but says that only time will tell whether the change is a genuine one or designed merely to "defeat my resolution."

The Wisconsin law maker hopes the F.T.C. will focus its attention primarily on the manufacturer-dealer contract when the investigation gets under way. Because of the contract's undisputed interstate character, he explains, it should be scrutinized in an effort to determine to what extent it is used as a "weapon of coercion." And he feels that the term "coercion" itself should be defined to learn if any alleged malpractices are punishable by the F.T.C. without further legislation.

Withrow insists he is not concerned over the intrastate problems as between dealers, explaining they can be solved by state licensing as is done under the Wisconsin law. He forecasts that state compacts between adjoining states to handle the

(Continued on page 500)

New Race Cars

Maserati and Alfa Corse Building Cars Under International Formula

Both the Maserati firm at Bologna and a new firm in Milan, known as Alfa Corse (Alfa Races) are building racers in accordance with the new international rules. In the past, Alfa Romeo cars have been raced mainly by the Scuderia Ferrari (Ferrari Stud), but it was felt that in order to successfully face the powerful German industry in international events, new arrangements were necessary, and the new organization was formed through the co-operation of the Alfa Romeo Industrial Corporation and the Scuderia Ferrari. It will be financially and technically independent of the parent firm, and its manager will be responsible only to the general manager of the Alfa Corporation. Alfa Corse will engage in the design, experimental development and use of racing automobiles. It will have offices, drafting rooms and a small garage which are separate from the works of the parent concern, from which it will receive technical and other assistance. The racers will be built in the works of the Alfa Corporation.

The new Alfa Romeo racer, designated No. 308, is based on the large Alfa stock car Model 8C, which has a displacement of 177 cu. in. The displacement has been increased to 182 cu. in. and the engine is provided with a supercharger, which is permitted by the new rules for engines up to 183 cu. in. displacement. An output of 306 hp. at 6000 r.p.m. is said to have been obtained from the engine, special high-octane fuels being used. The frame is built up of tubes of rectangular section. All four wheels are independently sprung. The vehicle comes within the width limit of 33 in. and its weight dry is 1870 lb., the minimum called for by the regulations. The 308 Alfa will probably make its debut in the Grand Prix to be run at Pau, France, on April 10, and may start also in the Grand Prize race at Cork, Ireland, April 25.

Lincoln-Zephyr Exports Gain

According to reports released by the Lincoln Motor Co., Lincoln-Zephyr exports this year to April 1 showed an increase of 26 per cent over the same period last year and an increase of 82 per cent over the same period in 1936. Exports for 1938 to April 1 were 2276 units.



THRILL Tiny model cars flashing along an indoor track at speeds reaching 40 m.p.h. provide a new type of thrill for grown-ups in the Model Car Racing Association of London. L. G. Tucker, Air Ministry official, is shown winding the rubber band "engine" of his car. All the miniature cars must be replicas of noted race types

Wright Corporation Report

A net profit of \$2,090,192 after depreciation, amortization, income taxes and \$95,596 provision for surtax on undistributed profits has been reported for 1937 by the Wright Aeronautical Corp. This compares with a net profit of \$1,057,098 for 1936.

Capital surplus at the end of the year 1937 amounted to \$1,516,467; the same as for the previous year.

Indianapolis Purse Increased To Ease "Tough Breaks"

An extra cash dividend has been declared for the annual 500-mile race classic scheduled for Indianapolis track on May 30. Purpose of the cash boost was given as being for the benefit of the drivers who finish near the end of the race.

In making public this information, Capt. E. V. Rickenbacker, president of the Indianapolis Motor Speedway, said, "We are adding materially to the total purse so that even the car that finishes in last place will be assured of a \$500 award from the speedway, in addition to the lap or accessory prizes that the driver acquires in the qualifying trials and in the race itself. With this change, the \$50,000 added purse will be swelled by additional awards to a total approximating \$100,000."

The prizes posted by the speedway for the first ten places will remain unchanged. They provide \$20,000 for the winner; \$10,000 second; \$5,000 third; \$3,500 fourth; \$3,000 fifth; \$2,200 sixth; \$1,800 seventh; \$1,600 eighth; \$1,500 ninth and \$1,400 for tenth place.

Labor

(Continued from page 495)

company union charges against the independent union and outcome of the investigation will determine whether two or three unions will contest the expected election.

Chrysler and the United Automobile Workers renewed their agreement without change shortly before midnight on March 31 when the contract would have expired. Until the last moment the union held out against renewal of the contract without incorporation of a guarantee against wage cuts but finally agreed to extension of the agreement for another year without change subject to ratification by the various Chrysler locals. To date two of the locals have ratified the extension with union officials crediting the action to assurances from the company that it had no intention of cutting wage rates. Originally the union had demanded modification of the "no strike" clause and the right to represent salaried office workers.

UAW-Federal Truce

A truce of one week marked negotiations between the UAW and the Federal Screw Works in a strike which last week saw several outbursts of violence when police escorted workers through union picket lines. During the truce the company has agreed not to operate its plant and the union has withdrawn its picket lines. Both sides expressed hopes that the dispute would be settled before expiration of the truce.

Negotiations for a new contract between the UAW and Briggs Mfg. Co. began on April 4 with the present contract expiring on April 17. The union announced it would seek a blanket 10 per cent wage increase, revision of seniority clauses and a closed shop. Some employees of the company returned to their homes on April 4 after they refused to pay their union dues to a UAW flying squadron which picketed the plant that morning. Others were admitted on promises to pay while paid-up members wore dues buttons.

March Factory Shipments Show Gain Over February

A 16 per cent increase in motor vehicle shipments was indicated for the month of March in the preliminary estimate of the industry's operations released by the Automobile Manufacturers Association.

The association estimated the industry's March volume at 235,000

units—an increase of 16 per cent over February operations. On the basis of this estimate, the industry's operations in March were 55 per cent under the corresponding month of last year which was the second highest March on record.

First quarter shipments were placed at 665,615 units—a decrease of 49 per cent under the same period of 1937.

The association's report summarized below:

March, 1938	235,000
February, 1938	202,872
March, 1937	519,022
First quarter, 1938...	665,615
First quarter, 1937...	1,302,108

Chrysler Wins Patent Suit

Chrysler Sales Corp. won a victory in the New York U. S. District Court in a patent infringement suit involving the "Chrysler Automatic Overdrive" when Raymond De Filippes, plaintiff, filed stipulations consenting to discontinue his action "without prejudice" to a new suit.

De Filippes filed suit in February, 1937, claiming that his patent No. 1,968,030 issued on July 31, 1934, as a "new and useful improvement in transmission" was infringed upon by the Chrysler automatic overdrive and asserted that he was damaged "far in excess of \$1,000,000." He asked the court for an injunction and accounting of profits.

Chrysler denied the alleged infringement and claimed that the plaintiff's invention was not properly patentable.

France Hopes For Early Motorcycle Revival

According to an article in *Plein Ciel*, the production of motorcycles in France, and especially the sale of motorcycles to private customers, has declined sharply in recent years. In 1931, 57,658 motorcycles were produced in France, and that year only a few hundred units were sold to the army. Last year the production had dropped to 15,000, and thousands of these were taken by the army, for the frequent replacement of an ever-increasing stock. However, the French manufacturers are not discouraged. For one thing, they figure (or hope) that large numbers of young men who have become acquainted with motorcycles during their period of service with the mechanized army, will upon their discharge buy a machine for their own use. Then, there has been recently a great increase of tandem bicycles in France, a machine that



(Globe Photo)

HISTORY It is England's fond hope that this plane may make history in trans-Atlantic air mail service for which it is destined. It

is the G-AEUV, first production model of the De-Havilland Albatross. With its four engines it is claimed to be able to carry a half-ton payload 2500 miles.

had been practically forgotten for many years, and the motorcycle manufacturers feel that if the "bicycle built for two" could stage such a sensational comeback, the motorcycle can too, provided the right plan for its repopularization is hit upon and adopted by the industry.

Production

(Continued from page 495)

an increase of 64 per cent over February compared with the company's normal increase of 75 per cent during this period. Buick's sales for the first quarter of 1938 totaled 34,138 as against 36,630 a year ago. W. F. Hufstader, general sales manager, announced that the eastern area contributed particularly to the March showing where unit volume was up 75 per cent over February.

Wayne County, Michigan, considered one of the most competitive automotive markets in the country because it includes Detroit, saw Buick registrations totaling 353 units during March to give it third place in registrations. This is the third consecutive month in which Buick has been surpassed only by two of the low price makes.

This week saw Ford register a significant increase in total output estimated at close to 15,000 units. General Motors showed a gain largely through the improvement at Buick, which projected 3000 units this week. Chrysler maintained its strengthened pace with close to 15,000 units and there were no changes in the output of independents, with the exception of Studebaker which went up to a projected 1020 over 600 a week ago.—J. A. L.

Apollo Loses Patent Suits to General Motors and Seth

General Motors Corp. and Stephen Seth won their patent infringement suit against Apollo Magneto Corp. when Federal Judge Vincent L. Liebell handed down a decision after trial in the New York U. S. District Court in their favor. An accompanying suit brought by Safety Steering Control Co. tried simultaneously, was also decided against Apollo. Judge Liebell ruled as "good and valid" both General Motors' patent on "improvements for a steering gear check," and Safety Steering Control Co.'s patent on "anti-shimmying device for steering mechanism," issued to Stephen Seth. A hearing before Special Master George A. Spohr was ordered to determine the amount to be fixed in both cases as damages against Apollo.

Both actions, commenced in March, 1934, charged Apollo and John Lencke, against whom the suit was dismissed, with infringing upon the plaintiff's patents and asked the court for an injunction and accounting of profits. The defendants in their answers contended that the inventions were not patentable because of prior use and invention.

Driver-Harris Plant Resumes

Difficulties between the Driver-Harris Company of Harrison, N. J., and the C.I.O., resulting in the closing down of the plant for three weeks, were settled on April 5. The plant has reopened and resumed operations in all departments.

Business in Brief

Written by the Guaranty Trust Co., New York

There was some improvement in general business activity last week. The weekly business index compiled by the *Journal of Commerce* stood at 71.5, as compared with 70.6 the week before and 103.9 a year ago. Inclement weather retarded Easter business, and retail sales were from 6 to 17 per cent below those in the corresponding period last year.

Railway freight loadings during the week ended March 26 totaled 572,952 cars, which marks a gain of 32,620 cars below those in the preceding week, a decline of 183,464 cars below those a year ago, and a drop of 21,837 cars below those two years ago.

Production of electricity by the electric light and power industry in the United States during the week ended March 26 was 10.2 per cent below that in the corresponding period last year.

According to a recent report issued by the Secretary of Labor, construction last year was about 10 per cent greater than that in the preceding year. This report is based on permits issued in 1728 cities, where the total aggregated \$1,700,-

000,000, of which nearly half was made up of residential buildings.

Lumber production during the week ended March 19 stood at 53 per cent of the 1929 weekly average. Shipments were somewhat heavier than in the preceding week, while there were only slight changes in the levels of production and new business.

Average daily crude oil production for the week ended March 26 amounted to 3,405,600 barrels, as against 3,433,550 barrels for the preceding week and 3,431,300 barrels for a year ago.

Professor Fisher's index of wholesale commodity prices for the week ended April 2 stood at 81.2, as compared with 81.9 the week before and 82.3 two weeks before.

The consolidated statement of the Federal Reserve banks for the week ended March 30 showed an increase of \$2,000,000 in holdings of discounted bills. Holdings of bills bought in the open market and Government securities remained unchanged. Money in circulation increased \$4,000,000, and the monetary gold stock rose \$13,000,000.

Withrow-Minton

(Continued from page 497)

problem is definitely coming to the fore.

It is his opinion that more advisory boards on the part of manufacturers would go a long way toward easing the situation, but if the F.T.C. confirms his claim that manufacturers are "forcing the market" and if it finds that dealer contracts are outside existing jurisdiction, then he favors legislation empowering the Interstate Commerce Commission to regulate the industry.

Chairman Wheeler, of the Senate Interstate Commerce Committee, told the Senate when his committee voted favorably on the resolution that "serious opposition to the investigation has not been offered from any sources."

"Charges of unfair contractual relationships on the part of automobile manufacturers with their dealers have been and are continually being made by persons without number," Wheeler wrote in his report.

"Manufacturers have been accused of compelling a dealer to make unwise and uneconomical disposition of the manufacturer's various products under a threat of dealership cancellation which, of course, entails loss of investment.

"One leading automobile manufacturer compels his dealers to sell certain products of his make which are wholly unrelated to motor vehicles, and failure of one of his dealers to distribute this unrelated commodity means orders of cancellation of the failing dealer's contract. Practices of this nature by the manufacturer leads inevitably to certain unfair trade practices.

"The tremendous size of the automobile industry and the widespread use of its products demand that the industry not engage in unfair practices. The public interest is affected directly by the manner in which the automobile manufacturers conduct their business. . . ."

A long list of allegations made against manufacturers in the original Withrow resolution were ordered stricken out by the House committee before it approved the measure, and

the modified resolution was the one which finally received Senate approval. Withrow characterized the deletions as simply the elimination of excess "gingerbread."

Philippine Trade Less Active

Following heavy automobile sales in the Philippines during January, business in this line has fallen off, due partly to the generally lower prices of Philippine produce. Truck sales in the Islands, however, continued good during February and early March, it was stated in a radio-gram to the Bureau of Foreign and Domestic Commerce from the office of the American trade commissioner at Manila.

Sales of tires were substantially better during February than in January and although stocks continued heavy, imports increased, it was reported.

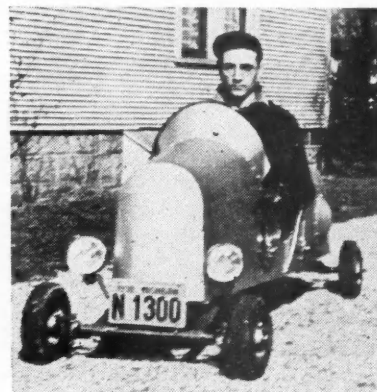
Letters

to AUTOMOTIVE INDUSTRIES

Editor, AUTOMOTIVE INDUSTRIES:

I am very much interested in midget autos and after seeing the picture of one made by Humphrey Cissel of Rockville, Md., in the March 12 issue of *AUTOMOTIVE INDUSTRIES* I am sending you a picture of one I have made which has been very successful and has drawn much attention at hobby shows.

It is powered by a one cylinder two cycle throttle-governed engine that develops in the vicinity of two horsepower or less. I don't know exactly what the rating is. It has a three-speed motorcycle transmis-



sion and the drive is through a jack shaft and chains (bicycle). It has lights, horn, clutch, brakes, foot accelerator and drives the same as any car. It will do 40 m.p.h. and better than 60 miles on a gallon of gas. It weighs 210 lb. and is registered by the State. The license costs 70 cents.

I did not keep account of cost in building it but I think it can be built for less than \$50. The parts can be picked up almost anywhere.

I would like very much to see more men build midget autos as a hobby. It is very interesting and instructive.

G. E. STAUFFER,
Muskegon Piston Ring Co.,
Sparta Foundry Div.

April 9, 1938

Automotive Industries

Aviation Corp. Reports Deficit

Aviation Corp. reports for the year ended Nov. 30, 1937, consolidated net loss of \$437,327 after all charges. For the eleven months ended Nov. 30, 1936, net profit was \$104,016. The 1937 loss included \$323,068 for engineering, experimental work and amortization of development expenses.

Unfilled orders for Lycoming engines and propellers, Stinson and Vultee airplanes amounted to approximately \$3,800,000 at the close of the fiscal year, and additional orders have been received totaling more than \$1,500,000. Net sales of manufactured products were \$3,987,362, compared with \$3,511,303 for the previous eleven months.

Automotive Diesel Firm Organized

A subsidiary for the manufacture of automotive-type Diesel engines has been organized by the firm of Burmeister & Wain, one of the largest manufacturers of marine Diesel engines in the world. It is known as Bur-Wain Autodiesel A.S., and has its headquarters at Strandgade 4, Copenhagen, Denmark. The smallest size of Diesel engine so far built by Burmeister & Wain was of the two-stroke type and intended for railcar use.

40 Years Ago

with the ancestors of
AUTOMOTIVE INDUSTRIES

A Wonderful Rotary

"A subscriber writes that he is devising a rotary motor 12x7 inches, without a spring in the heads or valves, and packing automatically according to the pressure supplied. It has seven parts, is made of aluminum bronze, and will resist from 500 to 1,000 pounds pressure.

"In connection with it a generator is used, about the size of a half bushel measure and made of the same material as the motor. A pressure of 1000 lb. may be reached if desired, regulation being effected by the simple turning of a key placed over a dial. The fuel is a compound of two of the cheapest petroleum products.

"The inventor of this wonderful motor calculates that 100 pounds pressure will be sufficient for the ordinary vehicle."

From *The Horseless Age*, May, 1898.

Automotive Industries



Underwood & Underwood Photo

HORSE ARTILLERY—

The First Brigade Royal Horse Artillery (now mechanized), whose equipment consists of Mark III Light Dragon trac-

tors drawing 37 mm. howitzers, is pictured here negotiating rough country during recent demonstrations at Aldershot, England, for students from the staff college at Camberley.

Tire Wage Cuts

*Goodyear, Goodrich and Firestone
Cut 10 to 20 Per Cent*

Ten to 20 per cent pay reductions for all salaried employees and executives were put into effect April 1 by Akron's three major tire companies—Goodyear, Goodrich and Firestone. The salary reductions affect all employees in the three organizations throughout the entire world. The reductions range from 10 per cent for salaries in the lower brackets up to 20 per cent for larger salaries and for all executives.

The salary reductions are seen by many as a possible forerunner of similar wage reductions. Recently the B. F. Goodrich Co. submitted to the Goodrich local of the United Rubber Workers a proposal to accept wage cuts of approximately 17½ per cent, or suffer the loss of 5000 Akron jobs through further Goodrich decentralization. The U. S. Department of Labor canceled the scheduled vote on the issue, when a group of Akron citizens rushed to Washington and protested on the ground that the employee referendum should be plant-wide and should not include only URW members. James P. Miller of the National Labor Relations Board now in Akron is endeavoring to work out a compromise in the situation and is studying with industry leaders the plan for stabilized, guaranteed employment as propounded by Akron civic leaders and as publicized last week in *AUTOMOTIVE INDUSTRIES*.

The Akron plants of the three major firms are on a six-hour day, whereas their subsidiary plants are on the

eight hour day with lower wages. Akron already has lost 15,000 rubber jobs through decentralization. Industry leaders contend the only way they can keep production in Akron is with longer hours and lower wages.

American Standards Association Conducts Safety Glass Survey

A survey by the American Standards Association indicates that 19 states and the District of Columbia have adopted the American Standard for Safety Glass (Z26.1) originally approved by the Association in 1935 and revised within the current year.

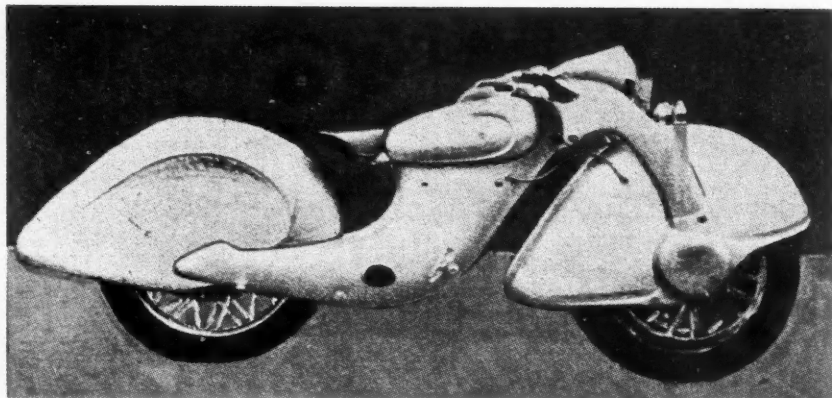
Thirty-one states and the District of Columbia now require it generally; three require it in certain classes of vehicles.

Specific requirements as to how safe the glass shall be vary widely in the legislation of the different states. In addition to the 19 and the District of Columbia which report adoption of the American Standard tests and specifications in full, two more contemplate adoption of the American Standard and a third refers to it.

Caproni Fuscaldo Injection System

In our issue of March 12, on page 396, we printed an illustrated description of the Caproni Fuscaldo electro-magnetic injection system for internal combustion engines using volatile fuels. We now learn that the owners of this system are represented in this country by M. Caserta, 1415 Glynn Ct., Detroit, Mich.

April 9, 1938



MODERN Streamlined motorcycle by Freund and Killinger of Monaco equipped with a three-cylinder

two-stroke engine of 36.6 cu. in. displacement. This motorcycle was exhibited at the recent Berlin auto show.

Chrysler Executive Changes

Advancements in the sales executive staff of the Dodge division of Chrysler Corp. resulting from advancement of A. Vanderzee to vice-president in charge of general sales development of the corporation, and of W. M. Purves to general sales manager of Dodge, have moved Forest H. Akers and Frank Timmens into assistant general sales managerships of Dodge. Mr. Akers has been in the factory sales department since 1922 and Timmens was moved up from manager of the New York region.

J. W. Hutchins, Detroit regional manager, has been advanced to fill Timmens' former place in New York. Charles Sering, director of used vehicle merchandising, becomes Detroit regional manager, and J. W. McLaughlin succeeds Mr. Sering as director of used vehicle merchandising.

Fatigue-of-Metals Research

The A. S. T. M. Research Committee on Fatigue of Metals at a recent meeting in Rochester, N. Y., started a project involving a comparison of results of fatigue tests made on different types of testing machines in common use. It is proposed to find out whether results obtained with one type of machine are substantially the same as those obtained with other types, or whether a "machine factor" must be considered. There was also a discussion of items of interest in connection with fatigue failures in service. Means of detecting the beginning of fatigue failure (by a spreading crack) were considered, and X-ray spectrographs, dying-out of vibrations in metals, and change of strength properties of metals before complete failure were mentioned, but none of these seems de-

veloped to a practical state so far. One speaker reported having observed a rather marked effect of a magnetic field on fatigue strength of notched bars.

Machine Tool Uptrend Continued

Upward trend in the domestic machine tool order index which started in February with a gain of 12 per cent over January, is expected to show a slight extension for March, according to a Dow-Jones report. Current rate of machine tool company operations is quite low, with most companies operating only 32 to 40 hours a week, whereas a few months ago many were running two and three shifts.

Ford March Sales

The last 10 days of March showed a sharp increase in sales by Ford dealers according to figures released this week by the company. New car sales during this period totaled 21,458 units, a 53 per cent gain over the second 10-day period, to bring total sales for the month to 48,436 units for a gain of 30 per cent over February sales. Used car sales volume for March was 122,000 units, an increase of 60 per cent over February, reflecting largely the results of the national used car exchange week. Ford dealers began the second quarter with 40,000 less used cars on hand than a year ago.

Studebaker Stock Issue

The committee on stock list of the New York Stock Exchange has authorized the listing of 75,000 additional shares of common stock (\$1 par value) by the Studebaker Corp. The authorization does not necessarily indicate that the security is to be immediately admitted to dealings.

Loeb Assails Reo Heads In Proxy Plea

William Loeb, a director of Reo Motor Car Co. who has been soliciting proxies in opposition to the company management committee, issued a statement replying to a recent letter signed by the committee.

Mr. Loeb declared false their statement regarding an agreement between him and Wallace T. Miller concerning the purchase of treasury stock below the market price.

He described the agreement as a "simple and sound arrangement whereby the rehabilitation of Reo was to be paid for with treasury stock at par instead of with cash the company did not have. Mr. Miller is suing Mr. Vanderlip for defeating the plan and has made me a party defendant for technical reasons, although he has absolved me from all fault."

In his plea for proxies, Mr. Loeb declared that his group has arranged for men and money to rehabilitate Reo.

Detroit Bans Sunday Sales

Under an ordinance adopted by the Detroit City Council, to be effective May 11, it will be illegal to keep an automobile salesroom or used car lot open on Sundays.

So strict is the ordinance that it will prevent even the annual automobile shows from being open on Sundays. The ordinance goes into effect 30 days after next Tuesday, so that the first Sunday closing under its provisions will be on May 15.

United Specialties Report

United Specialties Company's financial report for the 12 months ended Feb. 28, 1938, indicates a net income for that period of \$148,052.48. Profit from operations was shown as being \$227,916.39.

Auburn Automobile Co. Report

Report of the independent accountant upon the Auburn Automobile Co. and subsidiaries, in process of reorganization under Section 77B of National Bankruptcy Act, for fiscal year ended Nov. 30, 1937, shows consolidated net loss of \$3,424,612 after depreciation, amortization, equity in losses of subsidiaries, guaranteed preferred dividends to Lycoming Motor preferred and extraordinary losses resulting from discontinuance of automobile manufacture.

This compares with net loss of \$1,522,844 in preceding fiscal year.

GM Annual Report

*Salaries and Wages for 1937
Well Above 1936*

The annual report of the General Motors Corp. for the year 1937 revealed that the net working capital at the close of the year was \$347,216,166, as compared with \$339,686,551 at the close of 1936.

There was distributed in dividends a total of \$169,728,081 during 1937. In 1936 dividend distribution amounted to \$202,081,519. Net earnings available for dividends on all classes of securities in 1937 amounted to \$196,436,598.

There was retained in the business for its protection and expansion \$26,708,517, equivalent to \$0.63 per share.

An expenditure of \$61,725,000 was authorized for the expansion and improvement of the corporation's manufacturing facilities during the year. This was in addition to the normal expenditures for tooling and plant rearrangement incident to the 1938 product program. Forty-four million one hundred fifty thousand dollars of the total amount authorized was expended during 1937. The balance will be carried into 1938.

Salaries and wages paid by the corporation during 1937 amounted to \$460,451,744. The average number of employees on the payroll during the year was 261,977. This compares with payrolls of \$384,153,022 and an average of 230,572 employees for the year 1936.



ALBERT I. LODGWICK has been appointed president of the Stinson Aircraft Corp. He succeeds **B. D. DE WEESE** who recently resigned from that position. Mr. Lodgwick was formerly executive vice-president of the Aviation Manufacturing Corp.

L. A. FLEENER has been appointed manager of Pontiac Motors' Memphis, Tenn., zone, succeeding **J. S. EVENSON** who has resigned.

ROY H. SMITH, formerly executive vice-president of the Lamson & Sessions Co., has been elected president of that company. He succeeds **GEORGE S. CASE**, recently elected board chairman to fill the vacancy created by the death of **JOHN G. JENNINGS**.

E. C. KIEKHAEFER has been appointed chief engineer of the Stearns Magnetic Mfg. Co., formerly Magnetic Mfg. Co., Milwaukee, Wis.

DONALD P. HESS has been elected president of the United American Bosch Corp. He has also been elected to the board of directors of that company.

Automotive Industries

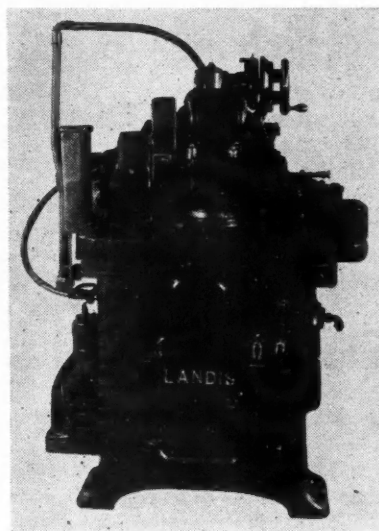


Hydraulic Chucking Grinder

... Landis machine for handling small parts that cannot be held between centers

For economical grinding of small parts that cannot be held between centers the Landis Tool Co., Waynesboro, Pa., has developed a 3-in., Type C, hydraulic chucking grinder. One manufacturer is now using this machine to grind outer raceways of small inner roller bearing rings. This is a taper grinding operation requiring a slight swiveling of the work head.

Operation of the machine is determined to a certain extent by the nature of the part being ground. However, the roller bearing ring job might be considered as typical. Assuming that the operator is ready to grind a piece of work on this machine, the first thing he does is to slip the ring on the expanding collet and push the control lever at the front of the bed to the left. Im-



Landis Hydraulic Chucking Grinder

mediately the work is clamped (work spindle rotation continues at all times), the wheel feeds in rapidly until it is about to come in contact with the work at which point it slows down to the predetermined grinding feed and feeds in at this slower speed.

Just before the work is down to size, the wheel base comes against a positive stop, there is a short

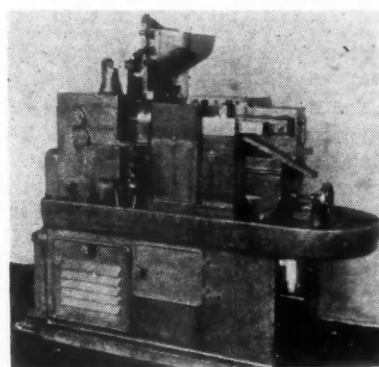
sparking out period which brings the work down to size, and when it reaches this point the wheel base quickly moves back to its original position. At the same time the work is unclamped and is ejected from the expanding collet by means of solenoid operated fingers.

Automatic Nut Tapper

... Waterbury Farrel introduces machine of entirely new design

What is claimed to be an entirely new design of automatic nut tapping machine is now being introduced by the Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Among the advantages claimed



Waterbury Automatic nut tapping machine

for the machine are: 1. A degree of accuracy which makes it practical to produce Class 3 and Class 4 fits on a quantity basis; 2. Speeds in excess of any that have previously been attained commercially in automatic nut tapping; 3. Simplified construction due to the elimination of complex means for chucking the tap; and, 4. Easy and convenient operation.

Plastic Molding Press

... 15-ton Greenerd equipped with automatic electric time cycle and ram control

A 15-ton, light plastic molding press equipped with automatic electric time cycle and ram control was recently brought out by the Greenerd Arbor Press Co., Nashua, N. H.

(Continued on page 505)

April 9, 1938

Automotive Metal Markets

Good Buying Volume in Die and Tool Steel In Contrast to Decline in Other Lines

A 9 per cent decline in this week's rate of steel mill operations, reported by the American Iron & Steel Institute as 32.6 per cent of ingot capacity, compared with 35.7 per cent last week, in the light of a better volume of incoming orders was looked upon as merely a temporary setback in the upward trend. Buying was reported to have improved especially in the Middle West, Chicago district mills reaping the most benefit. It is anybody's guess as to what extent hand-to-mouth buying by automotive consumers results from plans for radical changes in new model designs and reluctance, therefore, to order more of present gage and size flat steels than absolutely called for by current assemblies, but certain it is that steel stocks held by automobile manufacturers as well as parts makers are light. Small as orders run, many automotive buyers insist upon prompt shipment. If they held good-sized reserves, this would hardly be the case. Inquiry among die and tool steel specialists elicits the information that, in contrast with most other lines of steel, there is a fairly good volume of buying and inquiry. At a number of points, warehouse steel prices have been advanced 2 to 4 cents per 100 pounds to offset increased freight rates. Some warehouse men in the Detroit market talk of ignoring the small upward change in costs, but others say prices will be adjusted in the next few days. Little change is noted in conditions in the market for sheets and strip steel, finishing mills, for the most part, holding to their previous rate of operations.

Tin sold at the lowest price in five years early this week, when spot Straits tin was offered at 38¾ cents, without consumers showing any interest. A year ago the price of the metal was 60 cents. The world's visible supply at the beginning of April was the most ample in five years—around 29,000 gross tons. It wasn't so much this statistical showing that turned the market in buyers' favor as the influence of untoward conditions in the security markets and growing dissension among the tin producers over export quotas and buffer pool plans. The Dutch now ardently champion the proposed pool, which they hope will stabilize the price of tin at around 50 cents, while

the Federated Malay States producers would rather have the market freed from all artificiality, so that it might work out its own salvation.

Copper held fairly steady despite some adverse developments. Labor troubles in the copper and brass fabricating mills in the Connecticut Valley retarded the normal movement of metal. On the other hand, Europe showed more inclination to buy and several thousand tons were engaged for export on Monday at 9.60 cents c.i.f., European port. First hands continued to quote 10 cents for electrolytic, but in the

"outside" market quotations were fractionally lower.

Secondary aluminum specialists in the Detroit market reduced their prices on certain grades of metal and alloys by ¼ to ¾ cents a pound. Compared with a year ago, some alloy prices show a 3-cent per pound decline, but the price for pure metal of the best grade holds unchanged.

Cadmium prices have also been lowered by 15 cents a pound. At one time last year, bearing manufacturers, who had no contracts, paid as high as \$2 a pound for cadmium.

Zinc also gave way further, the price of Prime Western declining to the extent of \$2 a ton.

Interest in lead was quiet, routine business moving at unchanged price levels.—W. C. H.

Driver Regulation

Senate Approves Measure On Interstate Vehicle Operators

Uniform minimum requirements covering all motor vehicle operators driving in interstate commerce are prescribed under a bill which has passed the Senate and been referred to the House for further action.

Sponsored by Senator Truman, Democrat of Missouri, the measure would ban from interstate travel operators who were not properly licensed in the state of residence and, in effect, would require the various states to pass operators' licensing legislation laying down these uniform rules:

1. Require prospective drivers to pass examinations covering eyesight, reading and actual operating tests;
2. Require renewal of license at least once every three years;
3. Outlaw the display or possession of canceled, revoked, suspended or fraudulent license or use of another's permit;
4. Require that drivers be at least 16 years of age, and be required to give a complete description of themselves in license application; and
5. Empower the state to revoke or suspend the license.

As described by Senator Truman, the measure "does not in any way interfere with the rights of the states, and it does not create any Federal bureau or increase the number of employees of the Federal Government in any way. It is merely a statement of the requirements which should be possessed

by people who drive automobiles."

Before approving the bill, the Senate voted to strike out a provision which authorized the Attorney General to name enforcement officers and to prescribe further regulations under the law.

The enforcement provision as passed by the Senate merely prescribed a fine of not more than \$300 for violators.

Hearing Scheduled for Auto-Gyro Bill

The House Military Affairs Committee has scheduled a public hearing for April 26 to consider the Dorsey bill calling for an expenditure of \$2,000,000 for auto-gyro development.

Sponsored by Frank J. G. Dorsey, Democrat, of Philadelphia, the measure provides for experimentation, improvement and construction of rotary-wing aircraft and would authorize various Federal agencies to acquire auto-gyros.

Graham-Paige Offers Tractor Franchise

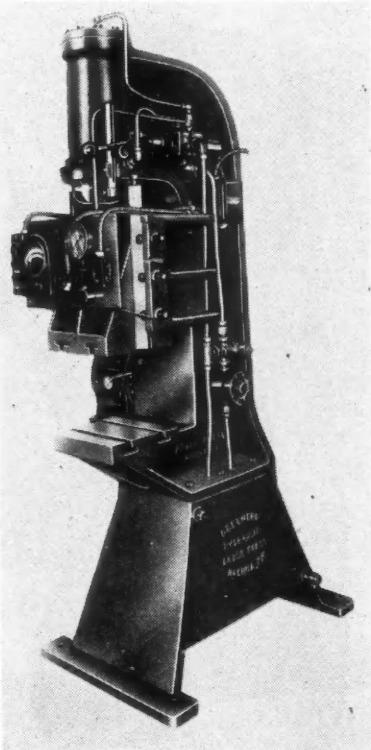
A plan aimed at giving the automobile dealer, particularly in agricultural communities, an added source of revenue was announced for the Graham-Paige Motors Corp. here today by Robert C. Graham, executive vice-president.

Under the plan not only Graham dealers, but those having other automobile franchises, will be offered the Graham-Bradley tractor and Bradley farm tools as part of the first comprehensive program for the sale of motorized farm equipment through regular retail automobile outlets.

Tools of Tomorrow

(Continued from page 503)

Essential specifications of the machine include: diameter of ram, 2 7/16 in.; bottom of crosshead or platen, 12 in. by 12 in. (with two T-slots for mounting fixture); working table, 12 in. by 12 in. (with two



Greenard plastic molding press

T-slots for mounting molds or fixtures); distance from center of ram to back of throat, 9 1/2 in.; distance from back of crosshead to throat, 3 1/2 in.; length of steel ways, 15 in.; distance from guided head to working table when head is at highest position, 12 in.; stroke of ram, 6 in.; speed of ram down, no load, 59 in. per min.; and speed of ram down, 15-ton load, 55 in. per min.

The ram has a maximum up pull of 13 tons. Pressure may be set on the down stroke from 1/2 to 15 tons. The amount of pull on the up stroke is approximately two-thirds of the pressure on the down stroke.

URW Opens Negotiations for Firestone Contract Renewal

Following its winning of collective bargaining rights at the Firestone Tire & Rubber Company by an employe vote of 3,696 to 2,564 on March 30, the United Rubber Workers Union of the CIO opened negotiations with the management of the Firestone Co. in Akron April 4 looking to a renewal of the URW's present

Firestone contract which expires April 28. Union negotiators headed by L. S. Buckmaster, president of the Firestone local, conferred with W. R. Murphy, Firestone Labor Superintendent. The URW contract was signed a year ago to end the eight weeks' Firestone strike. It was the first URW contract with a major tire concern.

While the recently organized Firestone Independent Employees Protective Association failed to best the URW in the collective bargaining election, the fact that it polled over 40 per cent of the employe vote indicates that it has sufficient strength to exert a stabilizing influence on the URW, observers say. The Association is only three months old.

Diesel Trains Purchased For Brazil Railroad

Five diesel trains for the use of the Central De Brasil Railway, of Brazil, have recently been built by the Fiat factory, according to press reports published in Rio de Janeiro and reported to the Department of Commerce by the office of the American Commercial Attache at Rio de Janeiro.

The trains consist of two cars each and are provided with air-conditioning and other modern facilities, the report stated. The speed of the trains is limited to about 50 m.p.h. and they will be operated between Rio de Janeiro and Sao Paulo, as well as from Rio de Janeiro to Bello Horizonte.

Calendar of Coming Events

Conventions and Meetings

- | | |
|--|-------------|
| Midwest Power Conference,
Sponsored by Armour Institute of Technology, Chicago, | April 13-15 |
| SAE National Tractor Meeting,
Milwaukee, Wis. | April 14-15 |
| Greater New York Safety Council, Inc., Ninth Annual Convention, New York City, | April 19-21 |
| Chamber of Commerce Meeting,
Washington | May 2 to 5 |
| American Foundrymen's Association, Foundry Show,
Cleveland | May 14-19 |
| National Battery Manufacturers' Association, Spring Convention, Cleveland | May 24-25 |
| SAE Summer Meeting, White Sulphur Springs, W. Va., | June 12-17 |

Dunlop Receives Share of GM Tire Purchases

A share of the original equipment tire purchase of General Motors of Canada Limited, Oshawa, Ont., hitherto the exclusive field of the Good-year Tire and Rubber Company of Canada, Limited, New Toronto, Ont., and Dominion Rubber Company Limited, Kitchener, Ont., has been allotted to the Dunlop Tire and Rubber Goods Company Limited, Toronto, Ont. The percentage which Dunlop will obtain will not be large at first but an important step has been taken in obtaining a share of this business. For the current year the additional sales which Dunlop will obtain may not be great. The year for the current models is almost half over and the new order requires the installation of new models and equipment. How much the contract will add to Dunlop's production is not yet known.

A.S.T.M. Organizes New Committee on Radiograph Testing

In order to carry out work on problems in the field of radiographic testing, the American Society for Testing Materials has organized a new committee, designated E-7. The new committee will extend phases of the work heretofore carried out by committee E-4 on metallography.

Under the leadership of Dr. H. H. Lester, the committee was formally organized at a meeting held in New York City.



The U. S. Department of Agriculture has released a booklet entitled, "Bibliography on Highway Safety."

Annual Report of the Engineering Foundation, covering the period Oct. 1, 1936, to Sept. 30, 1937.

The Farrel-Birmingham Co. has issued No. 26 of its series of booklets. This latest entitled, "Rigid Wage Rates and Costs."

Recommended specifications, tolerances and regulations for all types of commercial weighing and measuring devices are contained in Handbook H22 which has been released by the National Bureau of Standards, Dept. of Commerce.*

Information on the Knu-sine toggle clamp is given in a bulletin published by the Knu-Visc Products Co.*

*Obtainable from editorial department, Automotive Industries. Address Chestnut and 56th Sts., Philadelphia.

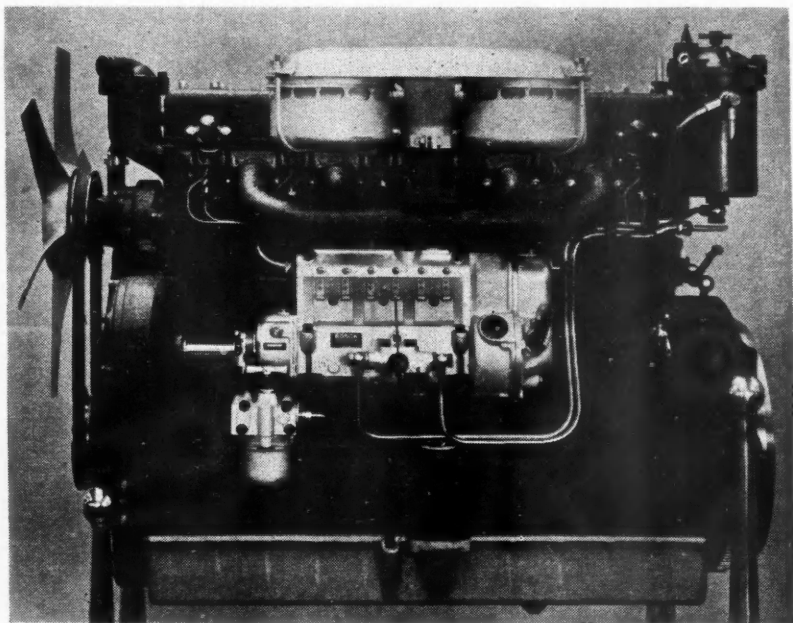
Diesels Predominate in Heavy Trucks

*Few technical developments were displayed.
Application of all-wheel drive increasing.
Use of bottled gases is growing. Gas generators are on the wane.*

By EDWIN P. A. HEINZE

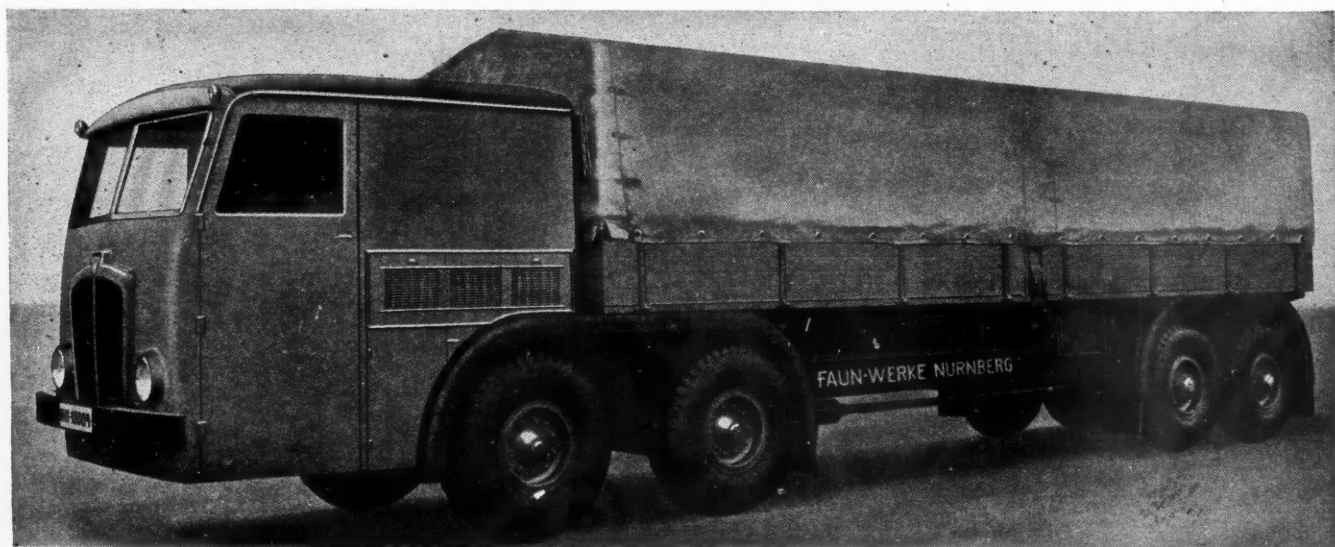
NOT much technical development was apparent in the commercial-vehicle section of the Berlin show, and few new models were staged. New regulations for heavy vehicles, issued in Germany in November last, permit higher axle loads, but the time interval had been too short to enable the manufacturers to adapt their manufacturing programs to these new conditions. The maximum gross weight for a four-wheeler is now 13 (metric) tons, provided no axle carries more than 8 tons. Six-wheelers may have a gross vehicle weight of 18.5 tons, provided no axle carries more than 6.5 tons. Vehicles with four or more axles may have gross vehicle weights of 6 tons per axle. It is expected that these new regulations will have an important influence on future design.

It was decreed by the Minister of Transport some time ago that



German army standard Diesel of the MAN type

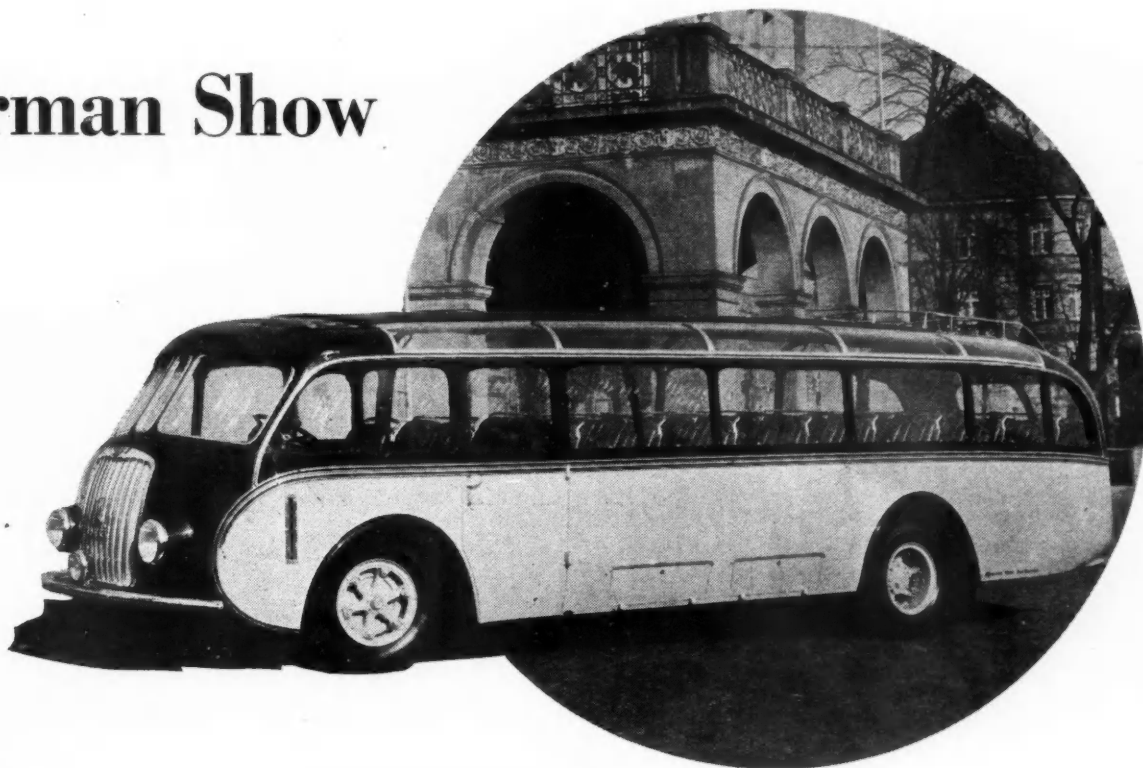
Faun eight-wheel truck with 200-hp. Diesel engine



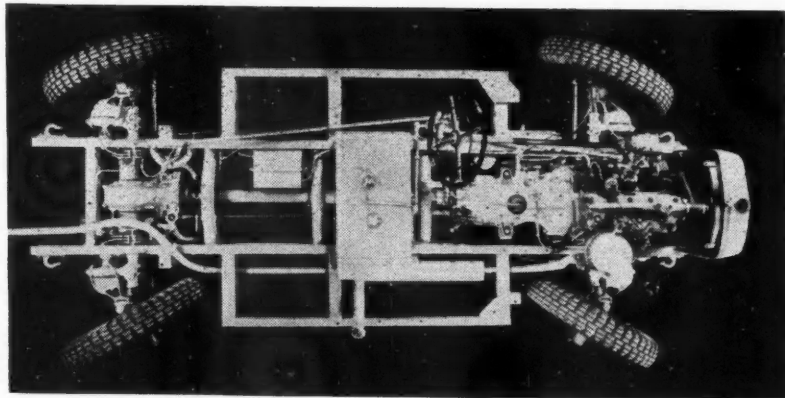
April 9, 1938

Automotive Industries

at German Show



Mercedes Sight-Seeing Bus with special body by Walter Vetter



The new small Mercedes-Benz four-wheel drive chassis with 48 hp. carburetor engine

freight transportation over the highways should be encouraged in every way. At first it was feared by the industry that after a brief period of rapid development, measures might be taken to limit further expansion of road haulage, for the benefit of the German State Railways; but the railroads have been doing so well in spite of the growth of road haulage that these early apprehensions are now considered unwarranted.

These conditions induced manufacturers to concentrate largely on the development of fast, large-capacity trucks. While there has been no increase in the number of chassis models with engines of more than 150 hp., engine powers on many of the smaller chassis have been increased to this figure, which the German industry seems to regard as the practical limit for road work. In the bus field also, chassis of higher power are rare, and the Henschel

250-hp. has been withdrawn from the market. On the other hand, several large horizontal engines are being produced for railcar use.

The increase in horse powers within the limit mentioned is due largely to the requirements imposed by the new super highways, displacements being increased in order to permit continued high traveling speeds without racing the engines. With the same object in view, some of the large commercial vehicles are fitted with five-speed transmissions, the fifth speed being an over-drive.

The Diesel engine predominates on trucks of 4 tons' load capacity and over, and on large buses, although carburetor engines are still being offered as an option on some models.

Independent wheel suspension is found only in the smaller Hansa-Lloyd trucks, at the front end (by links and a transverse spring), and on some cross-country trucks. These latter are now being offered in Germany in greater number, because of the tax relief granted users by the Government. All-wheel drive vehicles are finding increased application in commercial service, the reason being that German trucking concerns usually employ their trucks in combination with four-wheel

trailers, two trailers often being hooked up to a truck, as the maximum over-all length now permitted is 22 meters or 72 ft. 2 in. Under the new regulations, the maximum width for vehicles of all kinds is 2.50 m. or 98.4 in. As these transport trains have to be kept in service the year round, regardless of icy and slippery roads, the all-wheel drive has natural advantages.

The M.A.N. firm, which a few years ago produced only electrically-welded frames, has reverted to the riveted type, possibly because emergency repairs can be more readily made on the latter. Daimler-Benz favors Z-section members for the frames of cross country-type vehicles, reinforced by small bulkheads filling out the Z section.

Faun Works of Nuremberg have brought out an eight-wheeler fitted with an eight-cylinder vertical Deutz Diesel engine of 200 hp. at 1500 r.p.m. Its four-speed gearbox has an over-drive ratio. From the transmission the drive is through a divided, open, tubular propeller shaft to the over-slung worm of the first rear axle, and right on through a short shaft to a second worm on the other axle. This short intermediate shaft passes over a frame cross member on which the torque arms of both driving axles have their support. The two axles are suspended by a single semi-elliptic spring on each side, trunnion-mounted on the frame at its center. The pressed-steel wheels are shod with 13.50-20 in. tires. Axle spacings are as follows: First to second, 63 in.; second to third, 214 in.; third to fourth, 55 in. The over-all length of the truck is 38 ft.

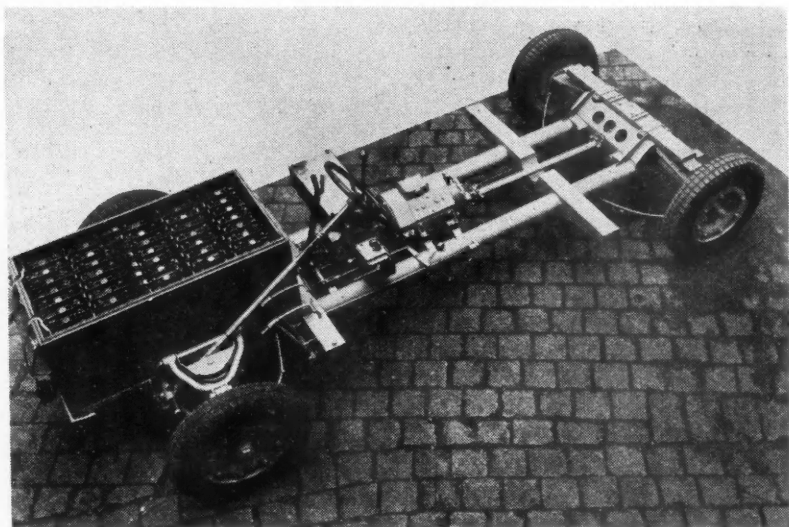
The chassis has a long overhang

at the front end, as the cab is located ahead of the engine. The cab extends back over the engine and is there provided with two sleeping berths, one above the other. The sides of the cab under these bunks can be removed to give access to the engine. Back of the cab the loading space is 28.2 ft. long and 7.6 ft. wide, and the load capacity is 15 tons, as the chassis weighs only 8.5 tons.

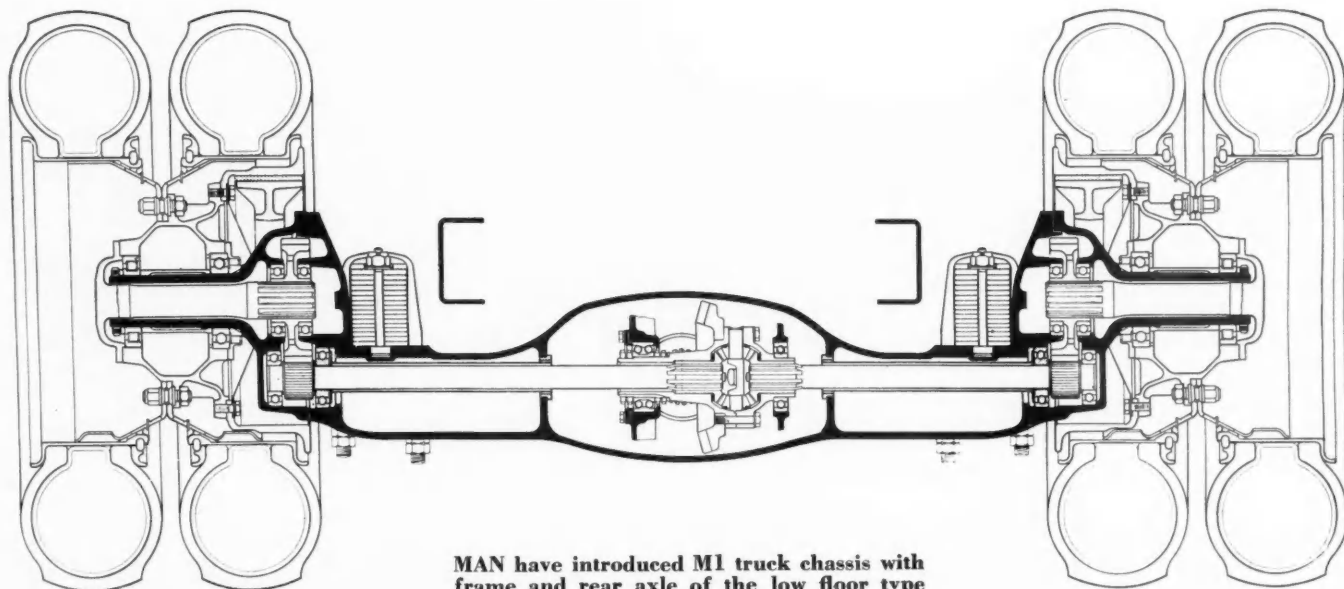
Although there is a heavy load on the two steering axles, steering is effected entirely by hand. This is made possible by inclining the steering spindles to give center-point steering. A standard screw-and-nut-type steering gear is employed; its drop lever connects by a tubular

drag link with a second drop lever pivoted on the frame ahead of the front axle, from which connection is made to the steering knuckle of the forward steering axle in the usual way. Behind the first axle on the frame side rail there is a third drop lever, which is interconnected with the second drop lever and connects to the steering knuckle of the second steering axle. Knorr air brakes are used on this truck, which has a maximum speed of 45 m.p.h.

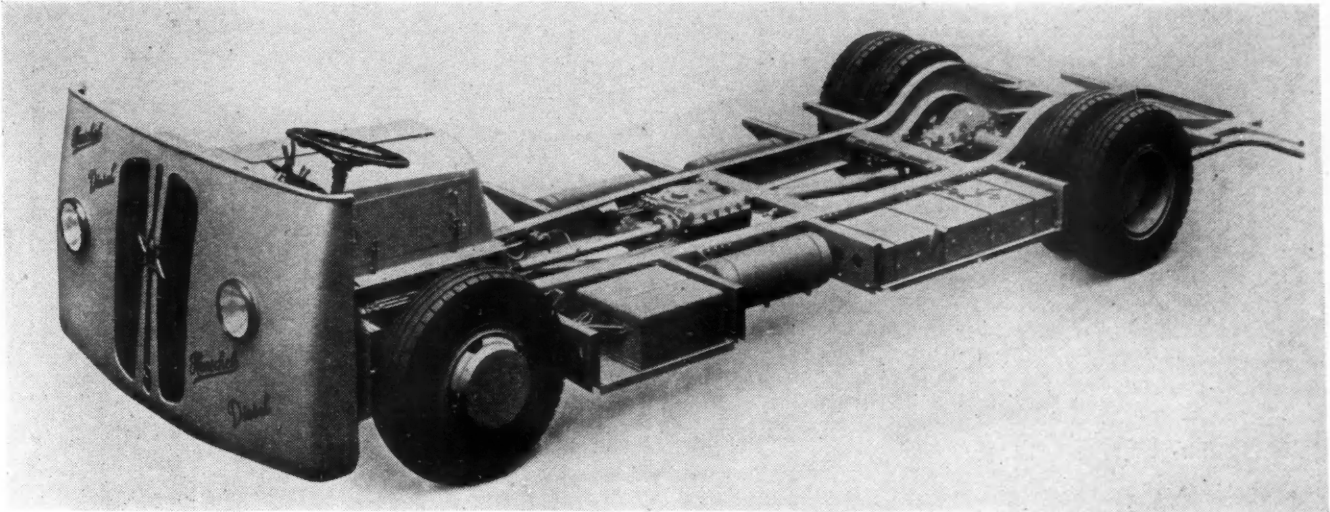
The new regulations call for a minimum road clearance of 10 in. at the center of the track, for trucks exceeding 2½ tons' carrying capacity. It may be less only if the lowest parts are capable of withstanding



Modern German electric truck chassis with standardized type of accumulator



MAN have introduced M1 truck chassis with frame and rear axle of the low floor type



Henschel omnibus chassis for 50 passengers powered by a 6 cylinder 100 hp. Diesel engine

impacts with solid bodies without damage. This change in the clearance requirements has led the Magirus Company to change from under-mounted to over-mounted rear springs.

Diesel-engined trucks registered in Germany increased from 28,878 in 1936 to 39,434 in 1937. In the course of that fiscal year, 50,000 new trucks were registered, so that every fifth one had a Diesel engine. However, practically all trucks of more than 3 tons' capacity, and many 3-ton and smaller trucks, are equipped with Diesels. The latter therefore have lost none of their popularity, and this has encouraged the Humboldt-Deutz Engine Works, with which Magirus is now associated, to bring out a new line of high-speed truck and bus Diesel engines. It comprises seven models which have many parts in common. The crankcase is in a single casting with the cylinders, and wet liners are fitted into the block. Each cylinder has a separate head, but the valve mechanism is protected by surrounding all of the cylinder heads by a pressed-steel frame, to which a common valve-gear cover is applied. The latter also covers the injection nozzles, secured into the precombustion chambers, which are located off-center, in accordance with Deutz practice of some years' standing. The oil-wetted filters on the air intakes are mounted on the pressed-steel frame surrounding the cylinder heads. Crankshafts have main bearings between each pair of adjacent cylinders, these bearings being lined with lead bronze. Connecting rods are drop-forged of chrome-molybdenum

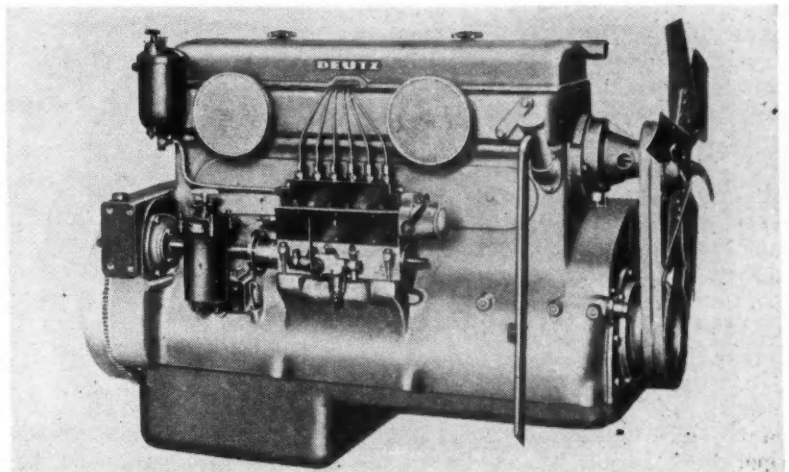
steel. Light-alloy pistons are used. The oil pump, which is driven by spur gears, forces oil through a filter of the metal-disc type (Auto-Clean) and through passages drilled in the block to the various bearings.

Humboldt-Deutz this year also has brought out a new design of injection pump. It is of the type in which the pump plungers have helical cut-off edges and the delivery is controlled by turning the pump plungers around their axes, for which purpose they are provided with lever arms connected to a control rod. This same system of quantity control has been adopted by the Deckel Company, manufacturer of the Compur injection pump.

The new Humboldt-Deutz line of

Diesel engines comprises a four and a six of 4.33 in. bore and 5.12 in. stroke; a four and a six of 4.33 in. bore and 6.30 in. stroke, and a four, six and eight of identical larger cylinder dimensions. The first two engines are rated 70 and 105 hp. at 2000 r.p.m.; the next two, 85 and 130 hp. at 2000 r.p.m., and the three large-bore engines, 100, 150, and 200 hp. at 1600 r.p.m. The eight-cylinder model is supplied also for railroad service, but in that case its rating is reduced to 175 hp. All of the above ratings are based on a b.m.e.p. of 90 lb. per sq. in. The eight-cylinder model is supplied also in the horizontal opposed form for under-floor mounting.

(Turn to page 524, please)



One of the new 130 hp. Humboldt-Deutz Diesels

Automobiles for RENT: The

Car Rental and Repurchase Plans

By M. W. BOURDON

VARIOUS large-scale passenger car dealers and distributors in Great Britain have in force a plan conceived primarily to enable visitors to England, who intend to stay in the country for three months or more, to buy a new or used car with the guarantee that it will be repurchased from them at a predetermined figure at the end of their stay. Permanent residents in England may take advantage of the plan, if they wish.

In one sense, this scheme may be viewed as a car rental plan, for among its options, in some cases, is one enabling the visitor to pay an agreed sum for what amounts to the rental of the chosen car for a stated period, as distinct from its purchase and repurchase.

Manufacturers' Approve

With the exception of Ford motor cars, to which we will refer later, this scheme represents an enterprise organized entirely without the assistance of the car manufacturers. It has their approval, but that is all. True, in one instance, the distributors who operate it are closely allied with the manufacturers of the cars they offer on the terms mentioned; this is Rootes Ltd., who are sole exporters of the Humber, Hillman and Talbot combination as well as distributors for London and a large part of the south of England.

Apart from the fact that it is confined to only three makes of cars, the plan as operated by Rootes has particular appeal to visitors by reason of the fact that it is worked in co-operation with distributors appointed by Rootes in over 50 countries in all parts of the world. This

means that the visitor to England can make all arrangements with the local distributor in his own country. He may do this well in advance of his departure and may, if he so desires, hand over to his local distributor a used car, obtaining a credit note to the amount of its agreed value. This credit will be accepted by Rootes as part-payment of the charges for the new car to be delivered to him upon his arrival in England.

Among other distributors in London offering terms similar to those of Rootes Ltd., is Car Mart Ltd. This firm is one of the largest retail automobile organizations in England with four sales offices in London. Cars of all prominent makes are handled in two of the offices; the other two offices are devoted, respectively, to the display and sales of Austin and Standard cars. The repurchase plan operated by Car Mart covers, therefore, a very large variety of makes, British and imported; but unlike Rootes, it has no sales representation in foreign countries. Residents abroad, if they wish to make arrangements in advance of their visit to England, must do so by mail.

Repurchase Schedule

Rootes' schedule of repurchase prices is as follows, expressed in percentages of the current list price of the particular car:

Period of Use	Repurchase Price
3 months	75 per cent
4 months	70 per cent
5 months	66 per cent
6 months	65 per cent

Special quotations are offered for a longer period than six months. Car Mart offers the same terms, with the addition of specified quotations for

nine and 12 months' use (60 per cent and 55 per cent, respectively, of the purchase price).

The following is given as an example of the cost of a car acquired under the Rootes plan:

Price of Hillman Minx	\$845.00*
Charges, including tax insurance, license, number plates, etc.	81.36
	<hr/> \$926.36

Guaranteed repurchase figure after 6 months' use at 65 per cent of list price (assuming this is still the same as at the date of purchase)	<hr/> \$549.08
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Cost of six months' use of the car	<hr/> \$377.28
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It is pointed out that in this example the cost per week is \$14.32 which, as will be seen, is much less than ordinary rental charges.

Prospective customers are told that deferred payments may be arranged; alternatively, they may pay the actual cost (\$377.28 in the above instance) to cover the use of the car, plus a small additional deposit and a financing charge.

If the prospective buyer decides to retain the car after use of it in England, Rootes will attend to packing, delivery to the docks, shipping documents, marine insurance, etc.,

* For the purposes of this article, the British pound has been taken as \$5.00, the shilling as 24¢, and the pence as 2¢ in changing the figures offered by our correspondent to their American equivalent.

British Point of View

at special rates. Such an arrangement may be made at the time of purchase if desired, and, in the case of deferred payments, these may be extended to cover a period subsequent to departure from England.

Both the Rootes and the Car Mart repurchase plans may be arranged to cover used cars. The percentage repurchase price varies as to the original price and the time of year; Car Mart express it as roughly 5 per cent less than in the case of new cars. Rootes offers three-months' warranty with all used cars costing \$500 or over, and free driving and technical instruction with new and used cars. They also offer, when prior arrangements are made through any of their various overseas distributors, to have the car waiting at the dock or airport when the buyer arrives in England, with everything ready for immediate use and a liveried chauffeur in attendance to assist in clearing luggage through Customs.

A repurchase plan on practically the same lines as those already mentioned has been put into effect by the Ford Motor Company itself and is operated in conjunction with the Ford organization and dealers in other countries. In this latter respect it corresponds with the Rootes scheme, for it enables all arrangements to be made well in advance of the intending visitor's departure from the country in which he resides.

The percentages of original cost guaranteed upon repurchase are the same for new Ford cars as Rootes and Car Mart offer and cover periods of use up to twelve months. Used Ford cars with reconditioned engines may also be acquired under a repurchase agreement; repurchase terms depending upon the model chosen. Usually, the terms are somewhat less favorable to the buyer if the purchase is a used car.

These repurchase schemes in general are highly attractive to visitors

to England intending to stay in the country for three months or more, if only for the reason that they save considerable difficulty in selling the cars for cash at a fair price at the end of the visit. In most cases the visitors in question are British citizens employed overseas, who return home "on leave" for three or six months at lengthy intervals—usually from two to five years.

The same facilities are available to permanent residents in England but are not mentioned in this connection in publicity matter, and their existence is known to comparatively few British motorists.

Similarly, there is no widespread publicity concerning another scheme under which many dealers in all parts of England are prepared to make terms with residents who wish to have a new car every year, although there are no standardized terms in this latter connection. There may be an agreed trade-in price to be effective after twelve months' use or a specified mileage, the first car in the series of transactions being purchased outright or by deferred payments. Arrangements of this nature are frequently made by industrial concerns requiring cars for the use of their traveling representatives. However, as in the case of the repurchase plans

PERSISTENT rumors say that an American automobile manufacturer will introduce a plan for renting passenger cars to the public instead of selling them. How much lies behind the rumor is impossible to ascertain.

Is the idea crazy? Not utterly.

Scores of automobile dealers in the U. S. rent hundreds of automobiles and trucks on contract to business establishments and individuals. Some of them have been doing it for 10 years or more.

In Great Britain, such schemes have received fairly wide advertisement. How does it work in Great Britain? Our British correspondent tells you in this story.

How much of it is already being done in the U. S.? What are the problems and implications of such an idea if it were to be introduced widely? These questions will be answered in a subsequent article.

referred to, motor manufacturers do not usually appear in the picture.

In addition to the repurchase plan the Ford Motor Company has in operation two other plans for the benefit of visitors to England. One is known as the Home Leave Delivery Plan, the other as the V-8 Triptyque Plan.

The Home Leave Delivery Plan applies to the English V-8 22 hp., the Ten and the Eight. There is no repurchase contract, but the plan enables the visitor to find a new car awaiting him on arrival—taxed, insured and ready to drive away—and to have all arrangements made on his behalf for shipment of the car to his overseas destination at the conclusion of his stay in England. Under this plan the prospective buyer has two options in regard to price; when ordering a car from the Ford organization or dealer in the country in which he resides in advance of his departure, he may arrange to pay either the retail price of the specified model in force in that country, which includes the cost of shipment to his destination when he leaves England, or he may pay the English list price plus delivery charges to the town or city in which he wishes to receive the car upon arrival in England. The English list price does not include cost of shipment to his own country, although the Ford Motor Company offers to arrange everything for him when required, at minimum charges.

Ford Triptyque Plan

The Ford V-8 Triptyque Plan enables the prospective visitor to England to make arrangements with the Ford organization, or dealer, in his own country to have a new Canadian built 30 hp. Ford awaiting his use in England and to use it in the United Kingdom for a period of up to twelve months without payment of import duty. As in the case of the Home Leave Delivery Plan, the car may be bought either at the retail price ruling in the country in which he lives or at the current English list price.

While in England, the car may be used for ninety days from date of import free of British motor vehicle tax, but after that period the ordinary tax at \$3.60 per hp. becomes payable.

In connection with this plan there are various formalities to be observed. The English Customs require a cash deposit or banker's indemnity of 33 1/3 per cent of the landed value, for instance, and membership of the Royal Automobile

Club or the Automobile Association is advisable in order to obtain the 90-day free license (International Circulation Permit). All arrangements in these matters and in respect of compulsory insurance, driving license, etc., may be made in advance by and through the Ford organization. This applies also to the repurchase plan of Ford, Rootes, Car Mart and other concerns offering this service.

The Ford Motor Company in England does not itself operate a purely hire (car rental) service; certain large Ford dealers do so but it is pointed out that hiring a car for three months or more is more expensive than buying one under a repurchase guarantee.

Rental Agencies in All Cities

In London and in nearly all other English cities there are car rental specialists, with fleets of cars available for hire for periods ranging from an hour to twelve months or more, either with a chauffeur or without when the period of hire extends beyond a few hours.

"Drive Yourself Hire Service" is extensively used, and among the firms which now offer this service is Daimler Hire Ltd., originally formed twenty years or more ago to provide chauffeur-driven cars only. This company will supply cars on a repurchase basis but does not specialize in this. Like some distributors and dealers, it has no standard schedule of terms but negotiates each transaction separately. An instance of negotiated terms is an offer by Daimler Hire Ltd. to supply a used Daimler Fifteen for six months with a guarantee to repurchase at 62 1/2 per cent of the price paid for it, the customer paying tax, insurance, etc.

Period	Drive yourself Rental Rates		
	Hillman Minx*	Hillman Fourteen*	Humber Snipe*
1 day	\$3.60	\$5.00	\$5.60
	5.00	6.20	8.60
Week-end (48 hours)	11.20	13.00	15.00
	15.00	17.40	22.40
7 days	22.40	30.00	35.00
	35.00	40.00	50.00
28 days	75.00	100.00	120.00
	120.00	140.00	175.00
8 weeks	137.40	190.00	230.00
	210.00	250.00	325.00
12 weeks	200.00	275.00	340.00
	300.00	375.00	425.00

* Current list prices of these cars are \$845.00, \$1240.00 and \$1725.00 respectively.

Among the firms specializing in purely rental services is Lex Garages Ltd., which has eleven depots in London. Cars are available with or without a chauffeur, all of those now in service being 1938 models of three types, viz., Hillman Minx (10 hp.) Hillman Fourteen and Humber Snipe (20 hp.). Rental terms vary for summer and winter, the difference ranging from roughly 25 per cent to 45 per cent as will be seen from the extracts below from the tariff of the Drive-Yourself-Service, in which the winter rate (October 1st-April 30th) is the lower in each case.

There is no limit to the mileage that may be completed during the period of hire; all cars are fully equipped and the rates include tax, insurance and the benefits of membership of the Automobile Association. It is, however, a condition that the hirer shall be responsible for the first \$25 of any damage to the car or claim from a third party. Gas and oil are not provided. Tire replacements, if required, are supplied upon demand, but if the hirer buys a new tire himself in an emergency the company will refund the whole-sale price only.

Lex states that it is rarely called upon to quote for rental services for periods longer than 12 weeks; they find that when a car is required for longer than that the customer prefers to negotiate a repurchase contract on lines already referred to.

There is no pre-arranged price for purchase of the car during or at the end of the rental period, but if the hirer wishes to buy the car a price will be arranged by negotiation.

As mentioned, the Lex rental service is confined to Hillman and Humber cars. In another case, Cumberland Hire Service, only Austin cars are offered. The tariff for comparable cars is much the same as that given above, though a smaller model is available, this is the Austin Seven at \$3.00 per day and \$20 per week (winter terms).

The majority of British concerns offering a Drive Yourself Hire Service use only British cars, but it may be of interest to mention one of the cases in which American cars are available. Chryslers of 1935 and 1936 models are offered; for a week-end (48 hours) at a charge of \$20.96; for a full week it is \$41.92. The rate per week is reduced progressively from \$41.92 to \$26.20 for periods ranging from two weeks to six months. These charges include insurance, unlimited mileage, tax and tires as in the other cases mentioned.

Just Among Ourselves

A Trend Appears in Corporation Reports

ENGLISH humor, it has often been said, is founded on understatement. On the other hand, annual reports of British corporations have long been distinguished for the chatty style of the rambling orations made by the chairman or managing director, or both. Often these addresses are published in full in paid space in newspapers, magazines, financial papers and the business press in general.

The portion of American corporations' annual reports devoted to remarks by the directing heads has in general, preserved the tradition of strong, silent men helming great affairs. Usually a few paragraphs are considered enough to keep the stockholders informed of events which may have shaken the corporation from reception desk to shipping dock during the year. One corporation whose labor troubles flared across the front pages of the nation during the past year, cautiously admitted in its pamphlet report that "certain disturbances to production during the year, resulted in an unfavorable influence on net profits whose exact extent is not available."

So it might be said the American corporation reports have been founded on the tradition of English humor, although they are not usually very funny.

A significant change in this condition has been evident during the past year. Several weeks ago we gave you some excerpts from the annual report for 1937 of the Caterpillar Tractor Co., a notable departure from the traditional style of corporation reports in the direction of providing complete information about the company in humanized form. Specifically, the Caterpillar report was aimed at employees of the company as well as stockholders.

A second notable contribution to this type of American literature is disclosed in the annual report of the Fifth Avenue Coach Company. In a letter to the editor, J. A. Ritchie, president of the big coach-operating enterprise (which, by the way, has introduced in its long history*, many innovations in public relations) says:

*Originally incorporated as Fifth Avenue Transportation Company Limited in 1885, the Fifth Avenue Coach Company is the oldest bus company in America. It was the first urban transportation company in the U. S. to use gasoline propelled motor buses. Its last horse-drawn vehicle was removed from the streets in the summer of 1907.

"You will observe that we have departed from the usual procedure of sending the report to stockholders only and that we are sending it to employees and patrons as well. A total of 50,000 copies is being distributed, a large part of which will go to our patrons through the mail and through distribution on the coaches."

Among the other recent company reports which show consciousness of changing trends is that of the American Rolling Mill Co. The report itself is a beautifully prepared graphic document. Included with it in the mail were reprints of two talks on American economics by George M. Verity, chairman, and Charles R. Hook, president of Armco.

Gentlemen, the annual report of your company is now something which should be removed from the category of a routine printing job. Its possibilities are worth the attention of the board of directors, the top executive, the advertising and public relations counsel of your company.

In Retrospection

NO one who came in contact for a moment with the astounding vigor of the late Andre Citroen will forget. Our own memory was stirred to reminiscence recently by the death of W. H. Frederick, who was Citroen's American representative for a great many years. And again by the serial publication in *La Revue de Agents*, a French automobile trade paper, of *L'Histoire d'Andre Citroen* by Charles Rocherand, who was associated with the Citroen enterprises for 12 years.

Citroen's career was colored by titanic difficulties, gargantuan solutions. Sometimes it almost seemed that he let the problems accumulate and become acute for the pleasure of working out the solutions.

In 1926 occurred one of the major crises. Dramatically M. Rocherand sets the stage:

"On March 30 (1926) M. Citroen received a gold medal for distinction in the development of foreign trade.

"From April to July, hundreds of millions of francs were swallowed up by a showroom at Deauville, where nothing was ever sold—at most, a single car. It was a fantastic dream of luxury.

"M. Citroen is made an officer of the Legion of Honor. His partner, M. Haardt returns from an African exploration trip, and receives the same citation.

"Each day, the Eiffel Tower reminds every Frenchman of the greatness of the Citroen name."

Meanwhile, the possessor of the name needed money so badly that he followed the precedent of his American idol, and tried to whip his dealer organization into a financing organization.

That was an incident among the many to recall of the man who tried to show Europe that America was not the only country that could produce a Henry Ford.

—HERBERT HOSKING.

Rapid Cylinder Wear a Serious Problem

ALEX. TAUB, former Chevrolet engineer, who has been connected with Vauxhall, in England, for more than a year, speaking of Motor-Car Engines in England*, said that in that country lubricating oils up to recently were bought by brands, but not by viscosity grades, and abnormally heavy grades were used in winter time, which resulted in starting difficulties and rapid cylinder wear. Oil companies in England greatly value direct recommendation of their brands by the car manufacturers, and such recommendation is usually one of the considerations in bidding for the oil requirements of car manufacturers.

That small cars are so popular in England is due not only to the high horse-power tax, but also to the selling price. A car of the Chevrolet, Plymouth and Ford size

* Paper presented at the S.A.E. National Passenger Car Meeting at Detroit, March 28-30.

sells at \$1,500 to \$1,800, and with incomes about one-half what they are in the United States, the reason

why the small car is favored is not hard to find.

That rapid cylinder wear has been a serious problem in England might have been concluded from the research work on the subject which has been conducted there. While discussing cylinder wear, the author mentioned some recent results of Mr. Gardiner of General Motors Research Laboratories, which indicate that if the mixture ratio is changed from 14:1 to 12:1, the rate of bore wear is multiplied by from 3 to 7. Taub's explanation of this effect is that the rich mixture dilutes the oil and therefore weakens the lubricating film.

The author found that in a certain English engine the rate of wear was much greater in the front than in the rear cylinders; in fact, the road miles per 0.001-in. wear were as follows for the six cylinders: No. 1, 2500; No. 2, 3500; No. 3, 4000; No. 4, 4900; No. 5, 4500; No. 6, 5400. One possible explanation is that the water from the pump is introduced in the forward cylinder, and the average temperature of the cylinders therefore increases toward the rear. The lesson to be learned is that "high-wall temperature, uniform throughout,

Fig. 1—Cylinder wear with two fuels dotted line, aviation - grade fuel; full lines, alcoholized fuel

A-B-C, $3\frac{1}{2} \times \frac{1}{4}$ rings
D, $3\frac{1}{2} \times 3/32$ rings

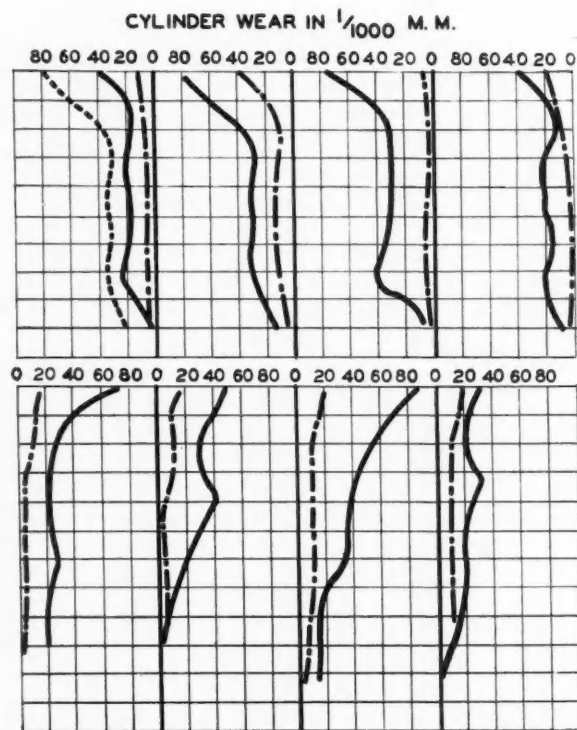
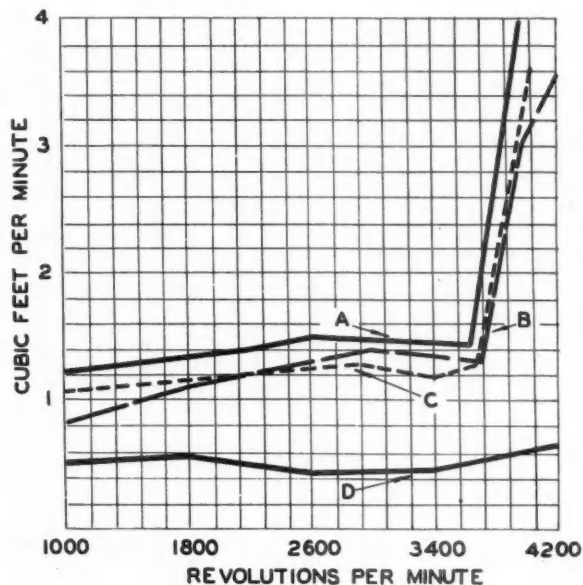


Fig. 2—Blow-by vs. engine speeds with different piston rings (A, B, C, $3\frac{1}{2}$ by $\frac{1}{8}$ -in. rings; D, $3\frac{1}{2}$ by $\frac{3}{16}$ -in. rings)

Dotted lines, aviation fuel. Full lines, alcoholized standard fuel

in English Engines

should be added to the list of 'musts.'

Fig. 1 is a wear chart of a German engine showing comparative wear with two kinds of fuel, viz., the German national alcoholized fuel, which is of a generally low order, and a 'non-alcohol fuel of aviation quality. The engine had no provisions for quickly warming up either the fuel or the water, and German rings are not particularly effective for either blow-by or oil control. The oil on the bore is not abundant, and what oil film exists may be weakened by the blow-by. It will be seen that wear was much greater with the alcoholized fuel, except in No. 1 cylinder. There is, of course, a great difference in the volatilities of low-grade fuel and a fuel of aviation quality. Besides, it is well known that alcohol has less lubricating value even than water.

Another item that has a bearing on the question of fuel responsibility for bore wear is that of prevailing mixture ratios under adverse conditions of operation. When starting from cold, the mixture ratio is about 1:1, while during the warming-up period it is 8:1 to 9:1. If a change from 14:1 to 12:1 multiplies the rate of bore wear by from 3 to 7, it can be readily imagined that a ratio of 1:1 at full choke and ratios of 8:1 to 9:1 during long warming-up periods cause a lot of wear. In view of the findings with regard to the effect of mixture ratio, destruction of the oil film by wet fuel should be given more consideration, and if it is, there may be found a real advantage in the automatic choke. Following are some of the conditions that will help to minimize bore wear:

(a) Thermostatic control of cooling-water temperature, the preferred temperature being 160 deg. Fahr.; the minimum, 145 deg.

(b) Crankcase ventilator, eliminating effects of blow-by in oil sump.

(c) Copious supply of oil to cylinder bores.

(d) Control of lubricant by the

piston rings, not at the source of supply.

(e) Control of gas blow-by at the rings.

(f) Leanest possible mixture for general operating conditions.

(g) Fuels that will vaporize properly.

(h) Ignition mechanism that times all cylinders alike; timing should be adjustable by competent service people only.

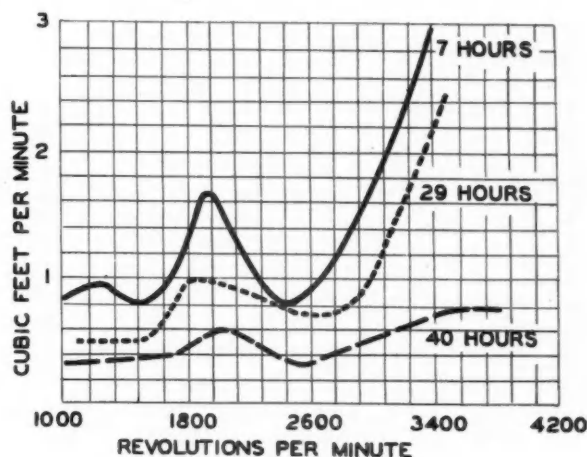
From 1920 to 1927, said the author, American piston rings were of the hammered type, of uniform radial pressure. The ratio of radial thickness to diameter was 28, and it took an average pressure of 7 to

give the maximum effect on a given engine. During this period, blow-by had become a serious factor. Modifications were made to meet the new conditions of higher speeds, temperatures and pressures, and perhaps the most important development was control of pressure distribution, which came about through an endeavor to shift the "break" in the blow-by curve.

Fig. 2 is a typical blow-by curve. Blow-by is already rather high at 1 to $1\frac{1}{4}$ cu. ft. per min., but at 3400 r.p.m. the "break" occurs, and at 3900 r.p.m. the blow-by is $4\frac{1}{2}$ cu. ft. per min. Now, experience indicates that $\frac{1}{2}$ to $\frac{3}{4}$ cu. ft. per min. throughout the normal operating range is ideal, as the conventional crankcase ventilator will take care of that. Excessive blow-by often is accompanied by hammering together of the ends, and consequent fracture of the rings.

In support of his claims for the high-pressure ring, Mr. Taub gave

Fig. 3 — Change of rate of blow-by with degree of wearing-in.



9 lb. on the diameter to close them up. Rings were finished with sharp corners, and they were cast by several different methods, the only requirement in the specifications being that the castings should be free from shrinkage strains. From 1927 to 1932 rings were individually cast, for longer life and less blow-by. The average pressure of these rings was 9 to 11 lb., and the ratio of radial thickness to diameter, 24. Hammering to shape was eliminated. Between 1932 and 1937 the ring pressure was increased to 16 to 18 lb. Rings were individually cast, and the radial-pressure pattern was controlled to

a curve of oil consumption for an engine fitted with such rings, which showed that at 1000 miles the oil mileage was 1100 per Imp. gallon, and that at 20,000 miles it had increased to 6000 m.p.g. With low-pressure rings, on the contrary, it is common to consume the first pint in 20 hours, the next pint in two hours, and twelve pints more in the next four hours. Piston rings control the oil consumption by virtue of their sharp edges, which scrape the oil off the surface, yet it is common English practice to "break" the edges.

The advantage of the drain-type oil ring is that it circulates oil, so

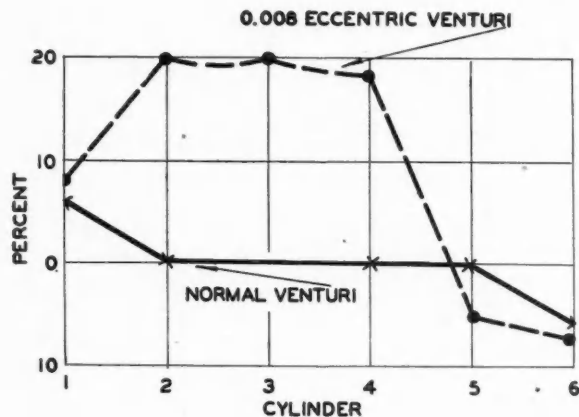


Fig. 4—Effect of eccentricity of fuel nozzle in venturi on distribution

that fresh oil is supplied constantly to lubricate the top rings and the upper end of the bore. For this reason the capacity of the oil ring and piston to pass oil is important. Strength or rigidity required is the limiting factor controlling drainage in both the piston and ring. Slots in the ring are limited by the breakability of the oil ring, and slots in the piston at the ring groove are limited because they tend to cause the lands to approach each other, pinching the oil ring and making it useless. Carefully-located holes have replaced the slots in the piston for this reason, and holes may eventually replace the slots in the oil ring.

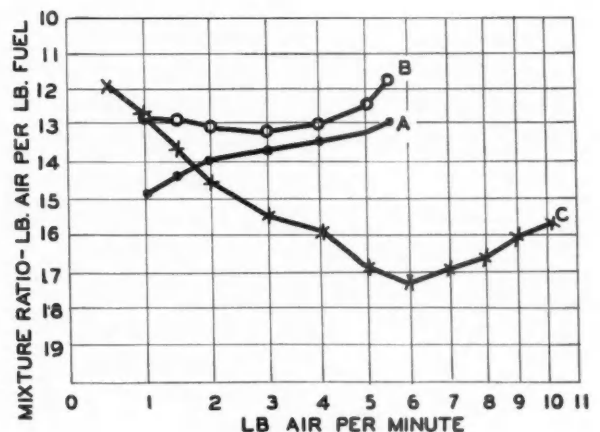
Fig. 3 shows three blow-by curves obtained with the same set of rings after various degrees of run in, and shows that the blow-by characteristics of any particular design of ring are not fixed.

As a cure for excessive bore wear the British industry has been offered austenitic sleeves and rings, but American practice gives 50,000-mile bores with cast-iron unlined blocks and rings, which avoids these expensive austenitic products.

The second part of Mr. Taub's paper dealt with carburetor developments carried out with the object of improving fuel mileages. Fuel economy is dependent mainly on the ability to burn lean mixtures, and combustible lean mixtures presuppose uniform distribution. It is particularly desired to have lean mixtures at part-throttle operation, for if the mixtures are lean under full throttle they are likely to cause trouble. Admixture of burnt gases with the combustible charge reduces the ignitability of the latter to a remarkable degree, and carburetor men have long complained of the overlapping of inlet

and exhaust periods, which resulted in greater dilution of the new charge with burnt gases. The old remedy for poor idling due to excessive admixture of exhaust gases consisted in increasing the valve clearance and the width of the

Fig. 5—Mixture-ratio characteristics of three different British carburetors (flow-box results under full throttle)



spark gap, and surprisingly good slow running was obtained in that way—often of course, at the cost of noisy valve tappets and missing on acceleration.

To be able to ignite lean mixtures at part throttle it is necessary to maintain a relatively high temperature around the spark points under this condition, for the ignitability of a mixture increases with its temperature. The hot spot of the manifold, in addition to improving the distribution, also raises the temperature of the entering charge, and therefore increases its ignitability; its favorable effect in the latter respect continues long after that on distribution has ceased. Ignitability of lean charges at part

throttle could be further increased by the use of a thermostatically-controlled, heated intake silencer, which would be cut out at full throttle. High back pressure in the exhaust system is very detrimental from the standpoint of burning lean mixtures at part throttle.

The greatest obstacle to the use of lean mixtures at part throttle is the overlapping of inlet and exhaust periods in many engines which, with the slow ramps now common, may be as much as 80 deg. As a rule, smooth idling and high tank mileage are out of the question with such valve timings. Automatic clearance adjusters, providing zero lash, always give stable slow running and improvement in economy, and Mr. Taub predicted that these would become popular both here and in England, for carburetion reasons alone.

The author also dealt in his paper with an investigation of the charge-distribution conditions in a

Vauxhall 14 engine, made by means of the Rabezzana-Kalmar method of spark-point temperature measurement, described in *AUTOMOTIVE INDUSTRIES* of March 19 and March 26, 1932. It was found that the carburetors had a strong effect on the distribution, the mixture delivered to the front cylinder in some cases being 30 per cent richer than that to the rear cylinders. That the carburetor was responsible was proven by turning it around through a half circle which made the mixture in the rear cylinder rich. The great difference in mixture ratio between front and rear cylinders existed particularly at full throttle and was due to wet fuel in the mixture. It was found

that the location of the fuel nozzle in the venturi had a great deal to do with distribution, and Fig. 4 shows that as the nozzle is moved into an eccentric position, the mixture in some of the cylinders becomes considerably richer, while that in other cylinders remains the same or becomes leaner.

Flow-box curves of mixture ratios for three English carburetors are shown in Fig. 5. Mr. Taub brought out that flow-box curves differ from mixture-ratio curves obtained on the engine, because the effect of pulsation is absent in the flow box. Thus, while curve A, Fig. 5, which applies to a modified 10-hp. calibration, shows the mixture to be leaner at the low-speed than at the high-speed end, when the carburetor is fitted to the engine the mixture is 10 per cent richer at the low-speed than at the high-speed end. Curves B and C were taken from regular production 10-hp. cars. Curve A, which slopes slightly in the right direction, shows a low-end mixture 15 per cent richer than needed, and B, which is parallel to A, indicates a mixture that must be very rich at the low-speed end. Curve C, Mr. Taub said, is incredibly bad. Four-cylinder engines are almost extinct in the U. S., and the effect of pulsations on distribution might be thought to be of little interest here, but the fact is that in an eight-cylinder engine with dual carburetor each mixing tube is subjected to the same pulsations as that of a single carburetor on a four-cylinder engine.

Fig. 6 shows three stages in the development of carburetor-calibration curves for the Vauxhall 10-hp. car. Curve A is the original calibration, which, the author said, is

typical of 90 per cent of English cars up to the middle of 1937. It will be seen that the mixture ratio is practically the same for full throttle and part throttle. The full-throttle mixture was very lean, and the job obviously was not a flexible one and was very slow to warm up. In the new calibration (b) the economy range was separated from the performance range, and it was possible to richen the full-throttle mixture from one-half to one full ratio. The part-throttle mixture was leaned from one to one-and-a-half ratios. The net gain was quite gratifying, because the job became very flexible and a pleasure to operate, and the fuel mileage went up four per gallon at the same time. This was accomplished by improving the ignition and calibrating a carburetor with independent part-throttle and full-throttle ranges. Because of limitations imposed during the first attempt, it was necessary to try again, and with corrected manifold and corrected carburetor distribution it was found possible to raise the fuel mileage 3 more per gallon, and at the same time to reduce the warming-up time to a fraction of what it had been.

Fig. 6 shows the flow-box chart of the second revision. With this calibration, the flexibility was increased and the warming-up time reduced. Besides, the fuel mileage was improved about 7 miles per gallon. The full-throttle mixture is leaner than it was after the first correction, this being made possible by the manifolding and carburetor correction, and the part-throttle mixture also is leaner, this having been made possible by improvements in the manifolding and more rational application of heat.

Sometimes the inlet silencer and air cleaner has an inordinate effect on the metering characteristics of carburetors, and Mr. Taub showed calibration curves of a carburetor in which application of the air cleaner enriched the mixture by as much as three ratios. Where the influence of the air cleaner is so pronounced, each individual device would have to be checked for flow resistance. A variation of half a ratio in the mixture strength would be reasonable, but in the U. S. the influence of the air cleaner on the mixture ratio has been entirely eliminated by placing the float chamber in communication with the air horn.

Developments in Automatic Shifts

S. O. WHITE, chief engineer of S. Warner Gear Division, in a paper on Transmission and Control

* Paper presented at the S.A.E. National Passenger Car Meeting at Detroit, March 28-30.

Developments*, briefly reviewed the developments of the past ten years and then passed on to a discussion of the present situation. A good automatic clutch, he said, is a delight to drive, and he hoped one would be available before long. It would be a greater help to the driver than an automatic transmission, and would not cost nearly as much. However, to get the most out of it, it would be necessary to use it in combination with a free-wheeling device or at least with a semi-automatic transmission. Mr. White thought that these devices, by making gear shifting and clutch operation easier, were more likely to postpone the arrival of the automatic transmission than to hasten it.

The amount of effort put into automatic transmissions, said Mr. White, has been tremendous, and all out of proportion to the value of the results achieved. They are always expensive, and their general public acceptance has yet to be proved. The transmission cannot be fully auto-

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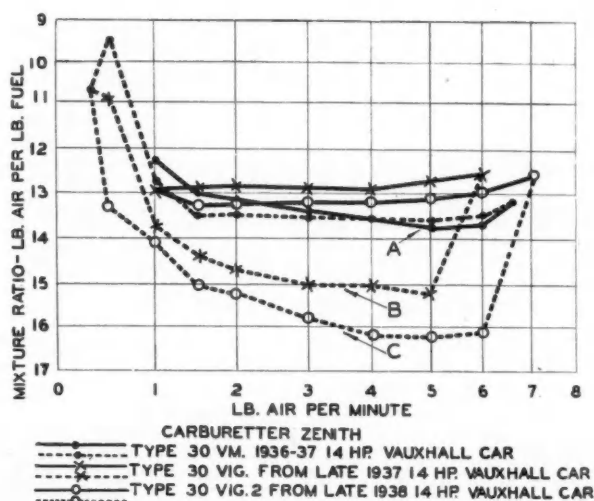


Fig. 6 — Three stages in the improvement of a carburetor characteristic by separating the economy and performance ranges

Franklin Aircooled Aircraft Engine

develops 50 hp., has a 3 5/8 in. stroke and bore with a displacement of 150 cu. in.

A NEW light aircraft engine developing 50 hp. at 2400 r.p.m. has been announced by the Aircooled Motors Corporation of Syracuse, N. Y. Production on this Franklin Aircooled AC-150 was scheduled to start early in March. The approved type certificate is No. 194.

This engine is the design of the former engineering chiefs of the old Franklin Automobile Company, who head the engineering staff of the present concern, which latter owns the name, trade mark and patents of the old Franklin organization. The AC-150 is the outgrowth of work on a four-cylinder opposed engine developed approximately 14 mos. ago for a light automobile. It is larger, however, having a displacement of 150 instead of 129 cu. in., which is necessary in order to develop 50 hp. at 2400 r.p.m. The new engine is

similar to the automobile engine as regards the crankshaft arrangement, the firing order, pistons, etc., but in order to meet aircraft requirements the rear bearing, that is, the one next to the propeller, had to be lengthened.

One of the features of the new engine is the use of Wilcox-Rich hydraulic valve lifters. Franklin engineers were among the pioneers in the application of this type of automatic valve adjustment, having used it for more than four years in their larger industrial engines.

The AC-150 engine has a 3 5/8-in. bore and a 3 5/8-in. stroke, which gives a displacement of 150 cu. in. By making the stroke no longer than the bore, the piston speed is held down, and it is possible to use valves that are large relative to the size of the cylinder. The engine originally was

designed to develop 50 hp. at 2575 r.p.m., with a compression ratio of 6, but the development work indicated that the compression ratio could be increased to 6.5 and the required power obtained at 2400 r.p.m., which permits of the use of a more efficient propeller. Gasoline of 73 octane or better is recommended for use in this engine.

The crankcase is of a high-strength aluminum alloy and has a removable cover which acts as a truss. It contains the three main bearings whose lengths are 3 in. (front), 1 1/4 in. (center), and 1-17/32 in. (rear). Main bearings are of the interchangeable type, steel-backed and babbitt-lined. Propeller thrust is taken on the long front bearing.

The oil pump is submerged in oil and comprises aluminum housings and duralumin gears. In the pump housing is located the relief valve, which opens when a pressure of 50 lb. per sq. in. is reached. To remove the oil pump it is only necessary to unscrew eight nuts from studs holding the bottom plate in place, and the whole pump and screen assembly then comes out. Lubrication is by the pressure system, including the rocker arms. A wet sump being used, no extra tanks or plumbing are required.

Cylinders are individually cast, with the valve-rocker box integral. These castings are of the British Y alloy, which has given very satisfactory service in the firm's heavy-duty engines. Into each cylinder is shrunk a liner of Ni-Resist, a material that has a coefficient of heat expansion of 0.00001, as compared with 0.0000123 for the Y alloy of the cylinder casting. The liner is shrunk into the cylinder with an interference of 0.012 in., and it is claimed that as the cylinder expands, the liner expands at approximately the same rate, so that a good thermal contact is maintained between them.

Valve seats and the exhaust-valve guides also are of Ni-Resist cast

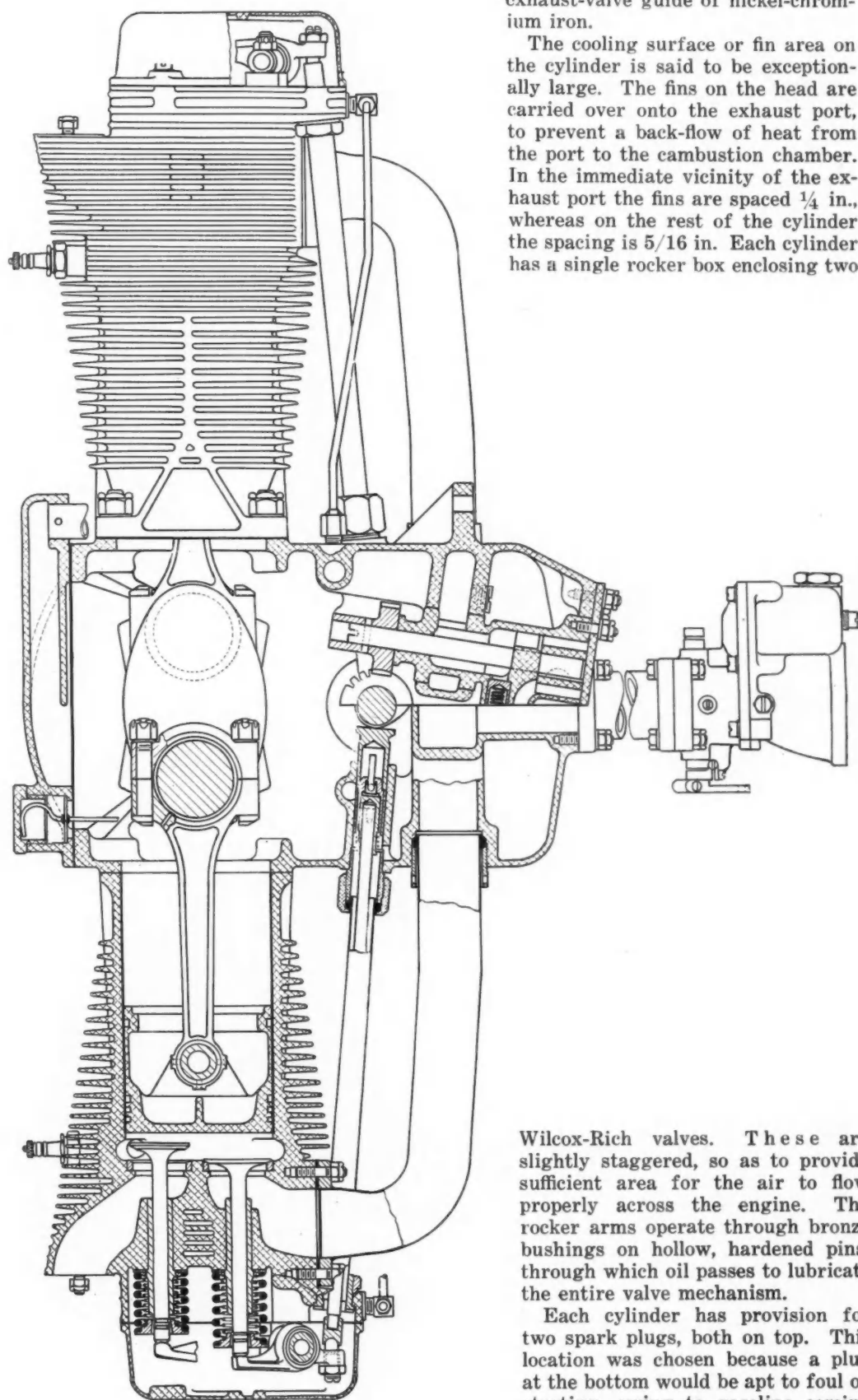


Franklin Aircraft engine AC-150 made by the Aircooled Motors Corp. who have taken over the former Franklin Automobile Co. patents

Franklin Aircooled Aircraft Engine AC-150

Number 15 of the Second Series of AUTOMOTIVE INDUSTRIES Engineering Drawings

Scale 1:3.53 ±



iron, both of these being fitted with 0.0035 in. interference. The intake guide is of ordinary cast iron, the exhaust-valve guide of nickel-chromium iron.

The cooling surface or fin area on the cylinder is said to be exceptionally large. The fins on the head are carried over onto the exhaust port, to prevent a back-flow of heat from the port to the combustion chamber. In the immediate vicinity of the exhaust port the fins are spaced $\frac{1}{4}$ in., whereas on the rest of the cylinder the spacing is $\frac{5}{16}$ in. Each cylinder has a single rocker box enclosing two

Wilcox-Rich valves. These are slightly staggered, so as to provide sufficient area for the air to flow properly across the engine. The rocker arms operate through bronze bushings on hollow, hardened pins, through which oil passes to lubricate the entire valve mechanism.

Each cylinder has provision for two spark plugs, both on top. This location was chosen because a plug at the bottom would be apt to foul on starting, owing to gasoline coming in from the adjacent intake port. Both spark plugs are located in a recess, away from the intense heat

of the combustion chamber. This arrangement was found to greatly prolong the life of the plugs and to permit of the use of automobile-type plugs if desired.

The intake valve has a clear diameter of $1\frac{1}{2}$ in., the exhaust valve of $1\frac{7}{16}$ in. Both valves have a lift of $\frac{3}{8}$ in. and stems of $\frac{3}{8}$ -in. diameter. Dual valve springs are used, the inner spring being only lightly stressed and intended mainly as a safety measure in case of failure

of the outside spring. Each valve is operated by a rocker arm and a pushrod in the Wilcox-Rich hydraulic lifter, which is enclosed to prevent oil leakage. Oil from the pump is forced through the headers and on to the hydraulic unit. Clearance at the valve stem is initially set to 0.040 in., but as soon as the oil enters the system all clearance is automatically taken up. The oil capacity of the sump is four quarts and the consumption of the engine is approximately

one ounce per hour at 2400 r.p.m. under full throttle. The one-piece drop-forged, alloy-steel, four-throw crankshaft has four counterweights, and is drilled for lightness and for pressure lubrication of the crankpin bearings. The propeller inner flange is forged right on the shaft, which obviates chattering and at the same time saves weight. Timing gears are of Celeron, of which this is said to be the first application to aircraft engines.

The alloy-steel connecting rods are of conventional design, with a bronze bushing pressed into the upper end, and a precision-type, steel-back, copper-lead-lined bearing in the big end. Ray Day aluminum pistons are used, and piston pins are full-floating. Each piston carries a Perfect Circle Type 200, $\frac{1}{8}$ -in. ring in the top groove, and a Simplex $\frac{1}{8}$ -in. Moliun ring in the next groove. Pistons are fitted with 0.0075 in. clearance. This is said to be the minimum for aircraft work and to be made possible by the fact that the cylinders and liners are of high-expansion material.

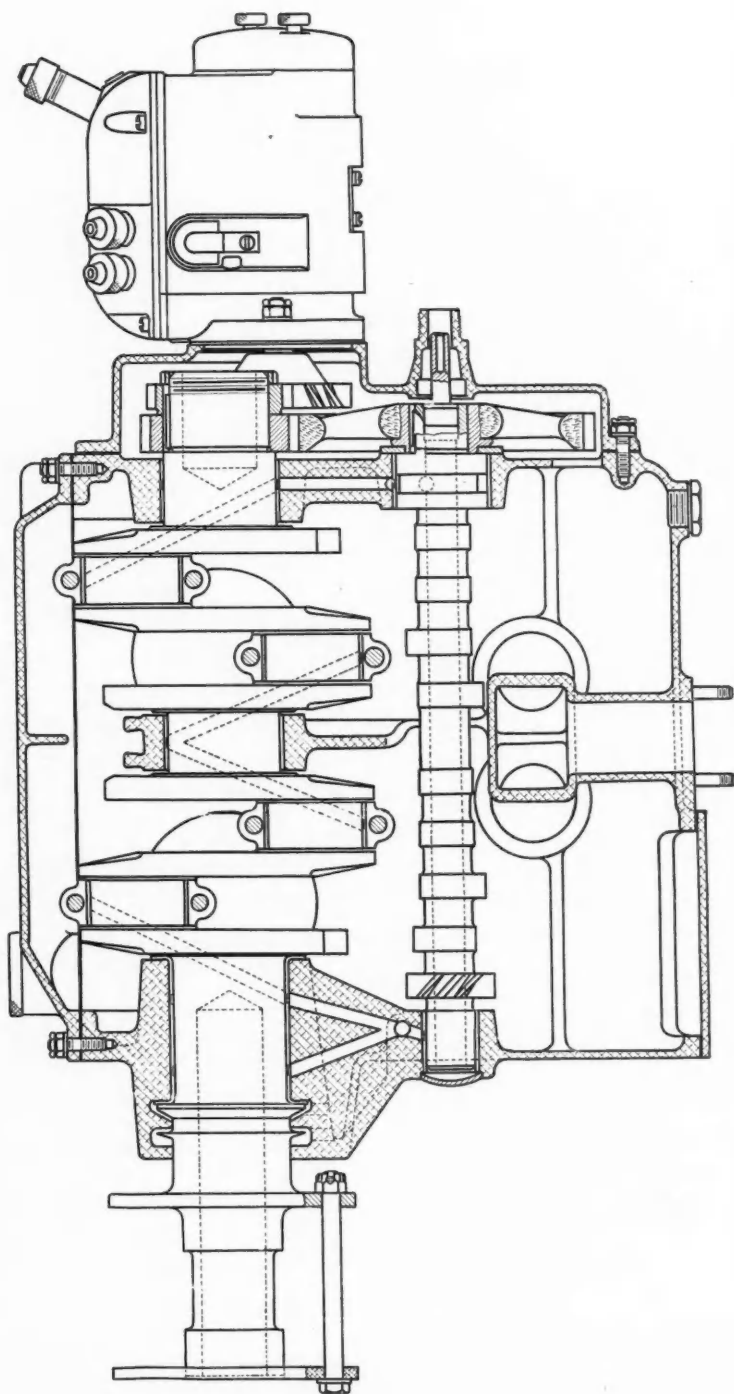
Carburetion is by a Stromberg NA-S2 up-draft carburetor with $1\frac{1}{8}$ -in. venturi and No. 52 main jet. From the carburetor the mixture passes through intake manifolds cast in the crankcase, where it is warmed and at the same time cools the oil. Separate aluminum intake pipes connect this manifold to all four intake ports. Exhaust-port outlets are on top of the cylinder, the exhaust being discharged horizontally. Where it is desired to direct the exhaust toward the ground, an exhaust system is provided which consists of down pipes at the rear of the engine, joined together to produce a uniform exhaust sound.

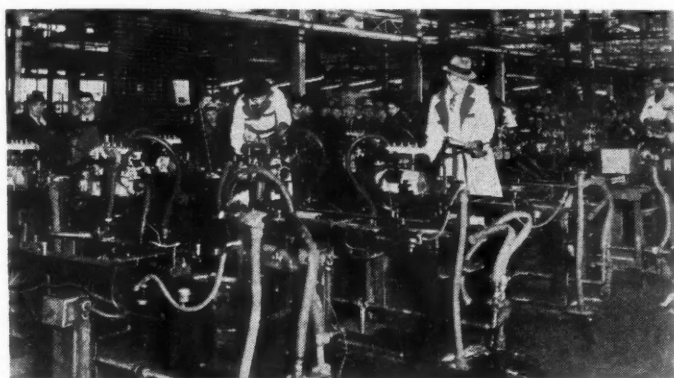
The Franklin AC-150 engine is regularly supplied with a single Scintilla magneto, with single plugs. However, it is available also with double magnetos, or with a single Scintilla magneto and an Auto-Lite generator and ignition system, or with dual Auto-Lite ignition systems.

The engine can be cooled by the slip stream from the propeller. Alternately, it can be provided with a self-contained cooling system incorporating a centrifugal blower mounted on the crankshaft and suitable housings conducting the air to the individual cylinders.

With single ignition system the engine weighs 154 lb. Its over-all dimensions are $34\frac{3}{8}$ -in. width, $27\frac{1}{2}$ -in. length, and $18\frac{3}{8}$ -in. height. The four supports on the crankcase are 10 in. apart laterally and $10\frac{1}{4}$ in. longitudinally.

Franklin Aircooled Aircraft Engine





In the engine test block and dynamometer department at the Bantam plant much interest was shown by a group of visitors.

Production Lines

Arc Welding

Fifth edition of the "Procedure Handbook of Arc Welding Design and Practice," easily the most ambitious and comprehensive of the publications of The Lincoln Electric Co., is ready for your work-table or bookshelf. In bringing up to date the current developments in the field of arc welding, the editors had to expand the covers to hold a book of over 1000 pages of real usable handbook material. As most of our readers are familiar with the general content of the preceding editions, we can give you the best picture by saying that the new handbook has everything discussed before, plus some new sections and revisions which may be noted as follows—new section on characteristics of the welding generator, AWS weld symbols, high speed automatic welding techniques, welding costs, SAE steel numbering system, machine design, structural design, also new welding applications in many industrial fields. While the book covers the entire field of welding, it has innumerable examples of automotive practice which will interest all of our readers. Despite the extra service, the price of the book remains the same—\$1.50 the copy in the United States.

Specs vs. Inspection

Recent correspondence on the subject of Diesel fuel data elicits an important note concerning the fundamental difference between the terms "specification" and "inspection" as applied to the characteristics of a Diesel fuel. According to our informant, an honest "specification" allows ample leeway for refinery variations where close control is not essential to good performance. It

happens that corresponding "inspection" figures almost invariably fall within a more narrow range. Result is that if a refiner cites typical "inspections," the figures will frequently look better than those which express the extreme limits. The conclusion advanced here is that "specification" figures are more nearly what the user wants and what should be published. In any event there should be unanimity as to which figures are published, so as to place every product on the market on a fair footing.

What's What

Need for a system of job evaluation—job standards if you will—was voiced by D. W. Weed, head of wage payment section, General Electric Co., at a recent meeting of the National Association of Cost Accountants. "Will industry undertake this work for itself or will the Government have to do it for industry?" asked Mr. Weed. The whole problem is one of determining values for individual jobs and the relation of one job to another. A proper system of job evaluation will encourage people to fit themselves for better jobs by showing where they are falling short of their present abilities. It will provide a promotion sequence and should aid in showing why certain jobs are worth more than others. Mr. Weed has something there.

Gear Shaving

Despite the recent progress in transmission gear manufacture, there has been no pause in still further improvement. One prominent manufacturer recently developed an enveloping gear generator which has been adopted 100 per cent

by a passenger car builder. We are told by the master mechanic's department that the new process is capable of limits of the order of 0.0002 in. on gear tooth elements in high production. Moreover, about nine months of service has proved that the cutters are good for 7000 gears between resharpenings.

Car Seats

Over at the University of Michigan the automotive engineering department is quietly working on a long-range program of research concerned with seat cushion design. First fruit of its efforts is a "wood" seat that appears to be more comfortable, so far as the anatomy is concerned, than any upholstered seat we have ever assayed. Said seat is made up of a number of individual sections cut out to a certain seat form. And each section is differently suspended on springs which have been carefully calibrated in accordance with the average loading on each critical section.

Gaging Holes

First of the precision gages for internal holes, in the Sheffield line, was proudly put through its paces at the ASTE convention. Amazingly, the small instrument has sufficient bed capacity to handle bores right up to 12 in. in diameter. Nothing made public on this development but we can get you more details if you want them.

Directional Properties

Recent issue of the *Copper Alloy Bulletin* has an interesting note on the directional properties in rolled brass strip. It points out that marked directional properties may be a serious disadvantage in many cases. The remedy is found in the control of annealing and rolling operations, limiting the extent of such properties in accordance with the nature of the application.—J. G.

Developments in Automatic Shifts

(Continued from page 517)

matic and meet all the conditions of the road. Controls must be added by which the driver can overrule the automatic when its action does not suit him. The average driver wants to drive his car the way he wants to drive it, even if his way is wrong. If his car is driven by a mechanism that does unexpected things and takes away his control, he will not like it. In Mr. White's opinion, the

automatic transmission is chiefly a luxury feature designed to make driving easier; the safety features are negligible and the flexibility and economy of operation can be secured by simpler and cheaper means.

All that is required, said the author, is a four-speed transmission, automatic between the two top speeds, and effortless shifting handled by a finger-tip remote con-

trol. The combination of a planetary over-drive with a conventional three-speed transmission is essentially such a four-speed transmission.

Mr. White also discussed the most desirable gear ratios for such a transmission. Four sets of ratios are given in the following table:

	1	2	3	4
	Speed	Speed	Speed	Speed
1st combination..	11.95	3.45	5.36	3.78
2nd combination..	11.7	7.05	4.55	3.28
3rd combination..	13.5	8.15	5.25	3.79

Of the above combinations the first is the average of those used on cars now fitted with automatic, planetary-type overdrives; the second is that used in General Motor cars with the new automatic transmission, and the third is one which Mr. White seemed to think particularly fits the present economic condition of the country. It would permit of the use of a smaller engine than now generally used, and this smaller engine would reduce the size, cost and weight of everything from the engine itself back to the rear axle. It would not be necessary to go as far in this direction as European practice, and yet show some real economy without seriously affecting car performance. Of course, tire sizes and power/weight ratios are important factors that cannot be neglected, but a reduction in engine size would carry with it many other weight reductions that would total to a worth-while figure. The author concluded his presentation with the statement that in view of the necessity for a reduction in car costs now faced by the industry, he threw out this suggestion which, while neither new nor original, might be worth rechecking at this time.

Viscosity Classification of Transmission Oils

A LITTLE over a year ago the Lubricants Division of the S.A.E. Standards Committee started upon a review of the viscosity classification of transmission oils, and somewhat later it formulated a new classification, which was approved by the Standards Committee in January last. Previously there were five viscosity classes for transmission lubricants—an unnecessarily large number—and the classification of all was based on their viscosity at 100 deg. Fahr., while the only recommendation regarding the choice of grades was that the heavier grades were to be used in summer, the lighter in winter time.

This suggested that it would improve the classification if the tem-

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Past the rocks of waste and extravagance, up the channels of precision and economy, the directed editorial effort of Chilton magazines bears them straight to the ports of profit.

Automobile Trade Journal, for car dealers only; Motor Age, for independent repairmen only; Motor World Wholesale, for jobbers only; Commercial Car Journal, for fleet owners only; Automotive Industries, for executives of automotive industrial manufacturing plants only.



CHILTON PUBLICATIONS

Chestnut and 56th Streets, PHILADELPHIA, PA.

peratures at which the viscosity is to be taken were lower for the lighter grades. S.A.E. 80 is a winter lubricant, and the Committee felt that its viscosity should be taken at zero Fahr. The winter grade in by far the widest use is S.A.E. 90, and after consideration of several lower

rear-axle lubricants are defined in the accompanying table:

"In the case of S.A.E. 80, the minimum viscosity limit is not specified, since this grade is for use at very low temperatures, at which S.A.E. 90 would be too heavy. The oil company furnishing the lubricant shall

be responsible for maintaining a sufficiently high minimum viscosity to provide satisfactory lubrication. In a similar manner the maximum viscosity limit for S.A.E. 250 is not specified since this grade is a special one, for use when S.A.E. 140 is too light.

"In the case of fluid greases made by adding soap or other thickening ingredients to oil, the viscosity number by which the lubricants are classified shall be determined by the viscosity of the oil before the addition of the soap or other thickening ingredients."

S.A.E. Viscosity Number	Viscosity Range Saybolt Universal	Consistency Must Not channel in service at deg. Fahr.
S.A.E. 80	100,000 seconds at 0 deg. Fahr. Max.	-20
S.A.E. 90	800 to 1500 seconds at 100 deg. Fahr.	0
S.A.E. 140	120 to 200 seconds at 210 deg. Fahr.	+35
S.A.E. 250	200 seconds at 210 deg. Fahr. Min.	—

temperatures, the Committee concluded that every purpose would be served by taking its viscosity at 100 deg. Fahr.

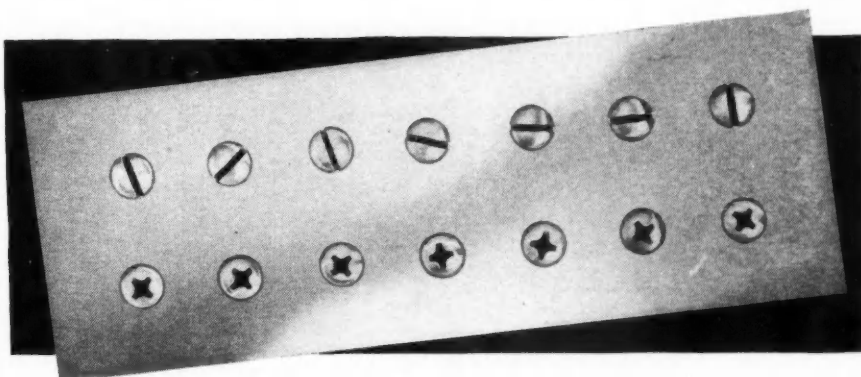
Previously there were three grades heavier than S.A.E. 90, Nos. 110, 160, and 250, all intended for normal summer use. The number of summer transmission lubricants was reduced to two, the 140 taking the places of both 110 and 160, and the 250 being retained. The temperature at which the viscosities of the summer grades is taken was raised from 100 to 210 deg. Fahr., the latter being much closer to the service temperature. Grade 250 is used to some extent in truck, bus and industrial service, but rarely in passenger cars. It is of advantage especially where oil seals are none too good, where it saves lubricant. Except for the fact that the viscosity is now taken at 210 instead of at 100 deg. Fahr., the 250 grade remains unchanged.

The old classification will remain in force, alongside of the new one, until July 1939. It is expected that refiners will immediately adopt the new classification and that during the next eighteen months practically all stocks of the old branding will have been consumed. Because S.A.E. 140 replaces two old grades, this, in a majority of cases, will not mean any actual change in lubricants now in existence. Most of the S.A.E. 160 oils now on the market are within the viscosity range of the new S.A.E. 140, so, in most instances, the only actual change will be in the brand number.

The new classification reads as follows:

"The S.A.E. viscosity numbers for transmission and rear axle lubricants constitute a classification in terms of viscosity and of consistency at low temperatures only. Other factors of quality or character are not considered.

"The viscosity range and consistency at low temperatures for the several classes of transmission and



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And that's no merry jest,
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PRODUCTS

THE NATIONAL SCREW & MANUFACTURING CO.
CLEVELAND, OHIO



Diesels Predominate at German Show

(Continued from page 509)

Buessing - N.A.G. continues the five-cylinder Diesel exhibited last year. Advantages are claimed for the five-cylinder over the six from both the production and operating standpoints. The torque on the crankshaft is more nearly uniform in the case of the five-cylinder (since no two cranks are in dead center at the same time), and in a six-cylin-

der of the same output the cylinder size would be smaller and the problem of fuel metering more difficult. By adhering to a cylinder side with which satisfactory results have been achieved in engines with other cylinder numbers, costly development work was avoided.

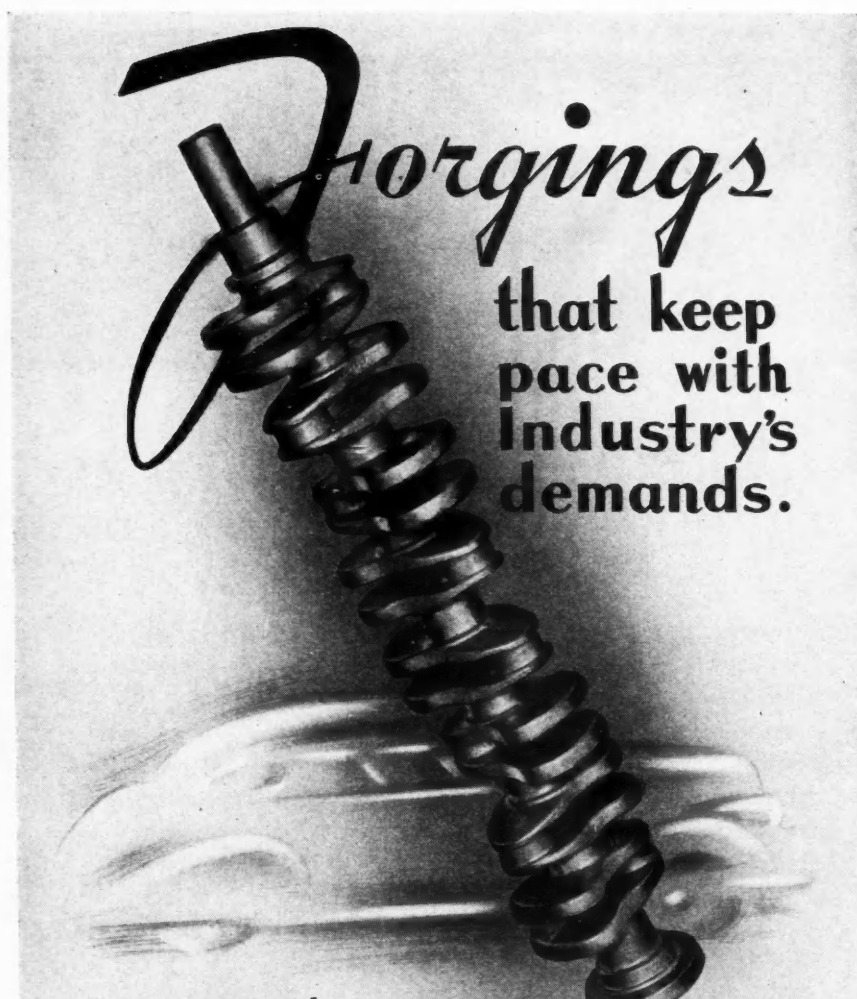
As reported in AUTOMOTIVE INDUSTRIES of Feb. 5, the Man, Hen-

schel and Humboldt-Deutz firms, at the instigation of the German army authorities, have developed a standard Diesel engine for use on cross-country all wheel-drive trucks, for which the Man air-cell principle was adopted. In the original lot of engines the crankcase-cylinder block is an iron casting, but it is intended to make this casting of a silicon aluminum alloy in the future.

Daimler-Benz Company has augmented its line of cross country-type vehicles by a small four-wheeler which is driven by a carburetor engine of a design similar to that used on its small passenger cars, but having a displacement of 122 instead of 104 cu. in. and developing 48 hp. instead of 38. The engine is mounted sufficiently high on the frame to allow the propeller shaft for the front axle to pass under it. All four wheels are both driven and steered, and the turning radius is only 10½ ft. The same coil-spring, independent suspension is used as on the large Mercedes passenger cars. The differential gears are mounted on the frame and drive the road wheels through jointed shafts. Engine and transmission are combined, and the power is transmitted through a transfer gear and short propeller shafts to the two differentials. There is a third differential in the transfer-gear housing. Steering as well as driving functions of the rear wheels can be cut out by means of small levers mounted convenient to the driver. The powerplant is rubber-mounted. This small car, supplied with an open four-seater body, is capable of more than 50 m.p.h.

Similar in lay-out are the larger all wheel-drive four-, six- and eight-wheel chassis, which, however, are equipped solely with Diesel engines, of from 70 to 100 hp. rating, and have front-wheel steering only. In addition, the company supplies its standard 3-tonner with rigid axles as a high-clearance model for use in rough country. A similar vehicle is offered by the Adam Opel Company, while Buessing offers its old all-wheel drive four-wheeler and Krupp the four- and six-wheeler with two- and four-wheel drive, respectively, and, in addition, a new six-wheeler of the same general design but with all-wheel drive.

Gas oil from German coal-tar and lignite-tar oils can now be used in nearly all German Diesels. The gas-generator movement has suffered a set-back, but development work on generators is continuing nevertheless. Mercedes-Benz have come out with a very elaborate generator outfit, in which practically all available



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dry fuels can be gasified. Other makers of gas producers, now about ten in number, also are making improvements, and during the past year the number of trucks and buses equipped with gas generators increased from 850 to 1130. Lignite, peat coke, and anthracite are coming to the fore as competitors to wood and charcoal as generator fuels.

Much more important, however, is the increase in the use of bottled gases. In 1936 only 506 trucks ran on these, but last year the number had increased to 6,067. Buses also use these gases much more extensively, their number having increased from 364 in 1936 to 766 in 1937. This is due largely to improvements in the methods of producing gases. Specially popular are the high-quality liquefied gases produced from coke-oven gas and enriched by hydrogenation. The number of municipalities installing compressing stations for city gas enriched with methane produced from sewage is increasing rapidly, and compressed gas is now being made available to long-distance transport vehicles even in quite small towns, some with a population of only 16,000. Special low-weight bottles of alloy steel have been developed for this service, weighing only about half as much as the standard pressure vessels. They are charged at the filling stations from regular gas taps to a pressure of 3,000 lb. per sq. in. in the same time it takes to fill other vehicles with gasoline or Diesel fuel. Generally, five bottles are carried, each containing the equivalent of 4 gals. of gasoline.

For city transportation the use of electric vehicles is encouraged officially, but is gaining only slowly. The number of electric trucks registered increased from 5,874 in 1936 to 6,341 in 1937, and that of electric buses from 13 to 20. Steam, on the other hand, is on the decline, despite the hopes attached to it some years ago when Henschel undertook to develop the system originated by Doble. Of the 16 steam trucks in service in 1936, only five were still registered in 1937; all five steam buses continued in operation, but there was no addition to their number.

France Trails European Production

ACCORDING to a report made by a committee appointed to make a survey of industrial production in France, which was printed in the

Journal Officiel, whereas neighboring countries (Holland, Belgium and Italy) have again reached the scale of production of 1929 and even surpassed it (Germany by 19 per cent. Great Britain by 25 per cent and Sweden by 45 per cent), the production index for France is still 25 per cent below that of 1929.

What is a Plastic?

THE following definition of a plastic was formulated by A.

F. Randolph of E. I. DuPont de Nemours, Inc., in a paper presented at the symposium on plastics held at Rochester, N. Y., by the A. S. T. M.: "A material which contains as its essential ingredient an organic binder and which, at some stage in its manufacture or in the fabrication of articles from it, is capable of being shaped by flow while in a plastic or liquid condition, and thereafter is capable of being brought to a more or less rigid condition."



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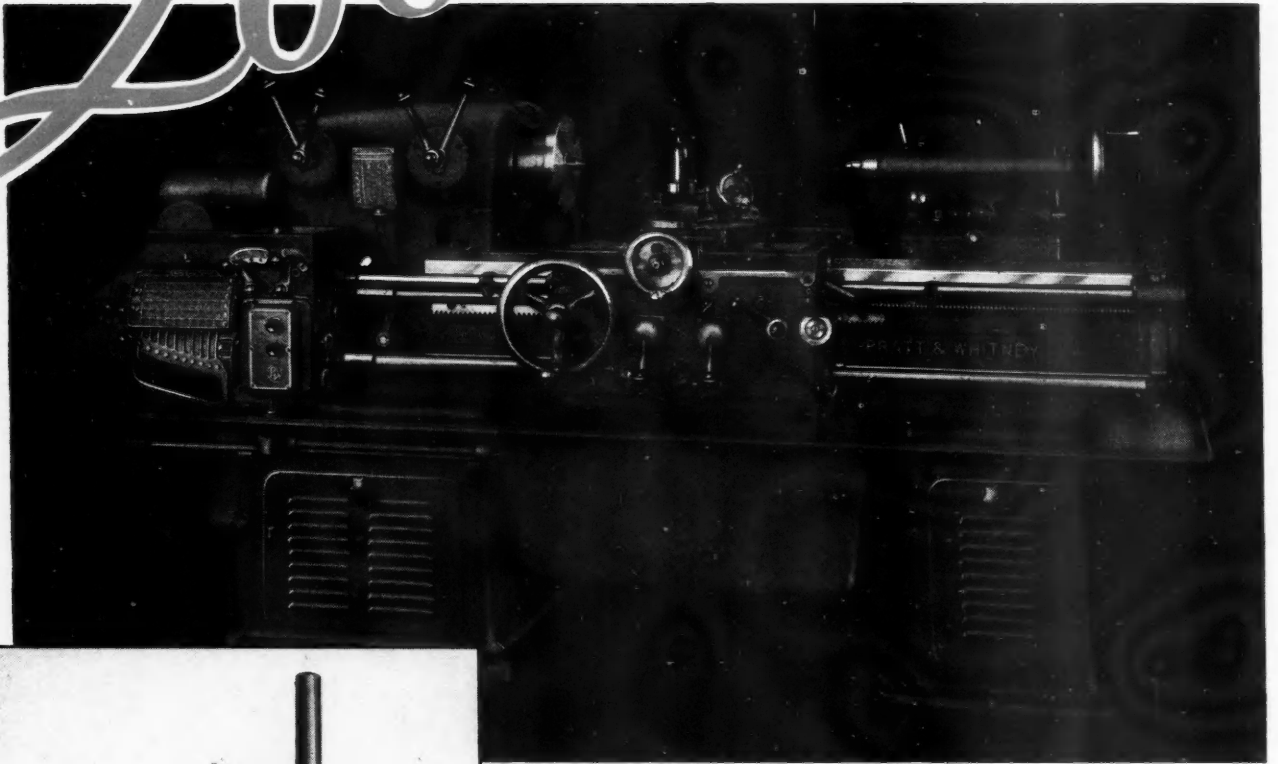
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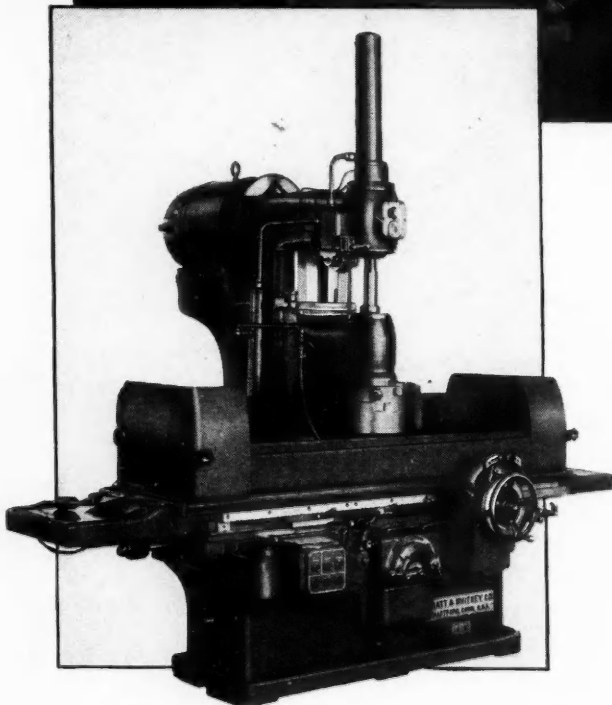
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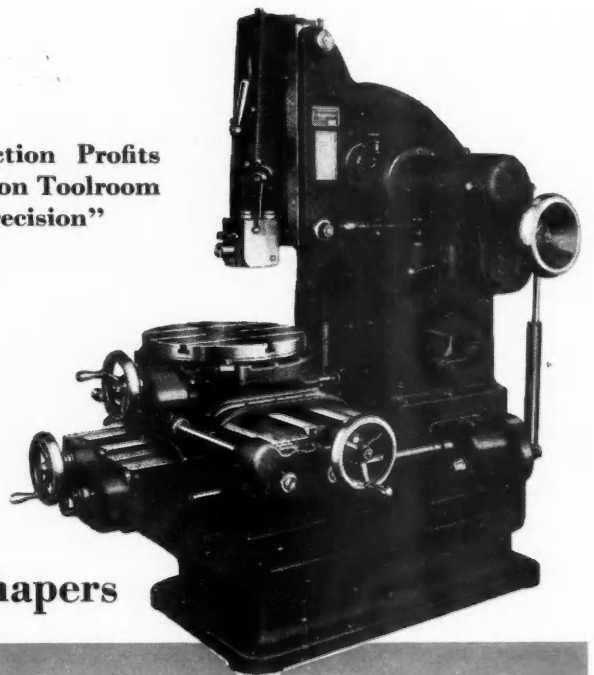


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